TECHNOLOGY DEPT.

- Details of A.B.B.'s new Filer City mill
- Valves – available types and materials
- Cost reduction – at APPMSA convention

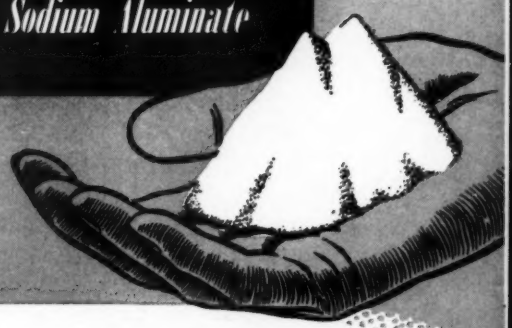
The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

$.95 SAVING PER TON OF PAPER* with

Requirements (without Nalco 680)	30.25 lb.
Requirements (with Nalco 680)	21.60 lb.
Pounds of Size Saved	8.65
Requirements (without Nalco 680)	40.00 lb.
Requirements (with Nalco 680)	30.00 lb.
Pounds of Alum Saved	10.00
Savings on Size (at 15.3 cents per lb.)	$1.32
Savings on Alum (at 2.2 cents per lb.)	.22
	$1.54
Less Cost of Nalco 680 (at 10.7 cents per lb.)	.59
TOTAL NET SAVING, per ton of paper	$.95

Nalco 680
STABILIZED Sodium Aluminate



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Cutting size and alum requirements is only one advantage of Nalco 680 – the best, the most stable commercial grade sodium aluminate you can buy! Use it for higher pH and lower acidity!

Don't confuse the production saving in this case history with a cutback in essentials. This mill makes fine writing paper, and quality is the number one requirement.

How Nalco 680 improved specifications while cutting the cost is obvious in the following: *Size test ratings jumped from a range of 45-50 up to 50-60. Ash content went from 5.6-5.8% to 7-7.1%.*

There are many, many other case histories of Nalco 680 success—power savings, greater alumina retention, cleaner machines, better products.

If you would like results like this in your mill, we suggest you check with your Nalco Representative. He has the facts on Nalco 680 applications and will help you all along the way.

NATIONAL ALUMINATE CORPORATION
6232 West 66th Place • Chicago 38, Illinois

THE Nalco® SYSTEM

CANADA: Alchem Limited, Burlington, Ontario
NORTHWESTERN UNITED STATES, HAWAII AND ALASKA: The Flox Company, Inc., Minneapolis 3, Minn.
ITALY: Nalco Italiana, S.p.A.
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SYSTEM...Serving the Paper Industry through Practical Applied Science

Jones
Vacuum Filter

Saves On Floor-Space and Labor

Steps Up Filler Recovery

Eliminates Chemical Additives

Designed primarily as a paper machine save-all, this new Jones continuous rotary vacuum filter rates high in efficiency on a wide variety of white waters, including those containing large amounts of filler materials — without chemical additives.

Completely automatic, its performance remains uniform throughout any normal variations in flow and solids content. In all cases this filter has markedly reduced fiber and filler losses — delivering recovered stock at up to 10%-15% consistency and producing clear filtrate (under 0.5 lbs. solids per 1000 gallons) suitable for showers — or discharge direct to sewers without further filtering.

Low retention volume, large capacity-for-floor-space-occupied, and minimum maintenance requirements are among the many other features. For details, see your Jones representative or write

Stainless steel drum with automatically controlled variable speed drive, is 75% immersed for maximum filtering; six-port distributor simply adjusted by external valves; travelling wire provides efficient removal of recovered stock.

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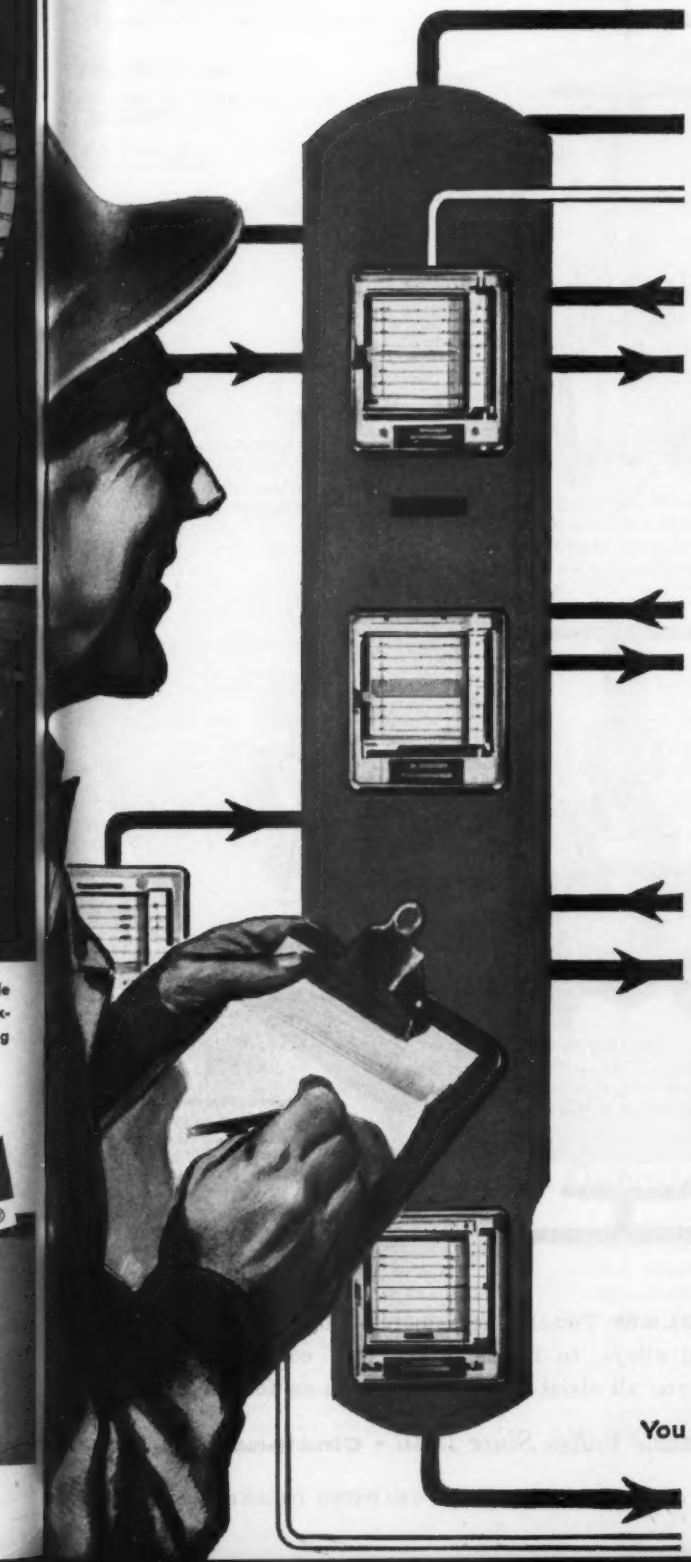
Jones®

Builders of Quality Stock Preparation Machinery

Nothing gets by

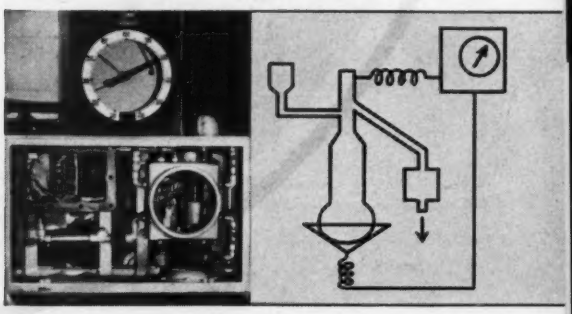
Automatic end-point testing device developed by Standard Oil research men makes certain of the uniform quality of gasoline and diesel fuel delivered to you.



Scientists at Standard Oil never stop in their drive to improve and then improve again the uniform quality of the petroleum products that bear the Standard Oil trade-mark. These engineering research scientists have now created wholly new instruments for performing near continuous physical analysis *automatically.*

One such instrument automatically performs the physical analysis that determines end-point. Using it, refineries maintain a continuous inspection of the temperature at which gasoline and diesel fuels are completely distilled. To you, this means that Standard is able to maintain a constant control over the uniformity and high quality of (1) the fuels you burn for heat or use to power your diesel engines and (2) the gasoline for your truck fleets. It also means that power- and heat-producing petroleum products, with their constantly controlled end-point, burn uniformly, give you uniform high performance.

This is part of the research pay-out, the "something more" research builds into the products you buy from Standard. This is your return from Standard's investment in research. And now there are 48 district offices in the 15 Midwest and Rocky Mountain states to serve you. Call the one nearest you. **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**



Automatic end-point tester works this way. A small sample is placed in an electrically heated flask. The temperature is measured and recorded during a heating cycle when distillation is accomplished. Distillate is condensed and drained, the flask temperature is lowered by introduction of the next sample, and the apparatus is ready for another test.

You expect more from STANDARD and get it!

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world's largest family of valves

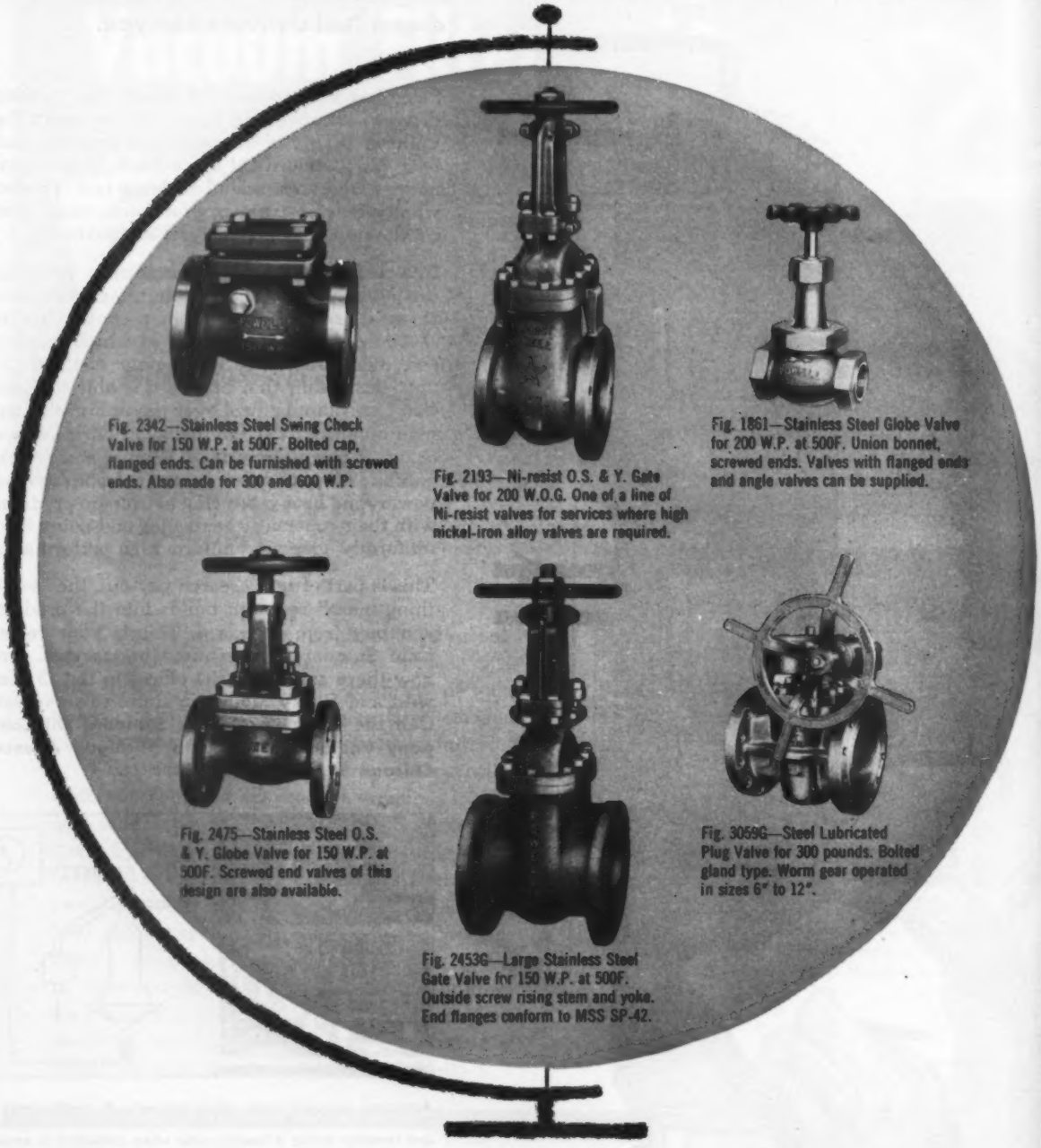

Fig. 2342—Stainless Steel Swing Check Valve for 150 W.P. at 500F. Bolted cap, flanged ends. Can be furnished with screwed ends. Also made for 300 and 600 W.P.

Fig. 2193—Ni-resist O.S. & Y. Gate Valve for 200 W.O.G. One of a line of Ni-resist valves for services where high nickel-iron alloy valves are required.

Fig. 1861—Stainless Steel Globe Valve for 200 W.P. at 500F. Union bonnet, screwed ends. Valves with flanged ends and angle valves can be supplied.

Fig. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 W.P. at 500F. Screwed end valves of this design are also available.

Fig. 2453G—Large Stainless Steel Gate Valve for 150 W.P. at 500F. Outside screw rising stem and yoke. End flanges conform to MSS SP-42.

Fig. 3059G—Steel Lubricated Plug Valve for 300 pounds. Bolted gland type. Worm gear operated in sizes 6" to 12".

FOR EVERY FLOW CONTROL PROBLEM Powell offers more kinds or types of valves, available in the largest variety of metals and alloys, to handle every flow control requirement. Your local valve distributor will be glad to tell you all about them. Or write to us for the full facts.

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The Paper Industry

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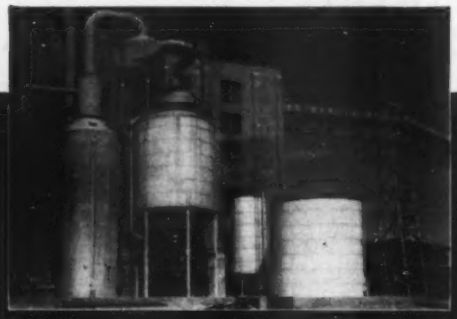
18

HORTON® STRUCTURES help boost production for Mead Corporation mill

Eighteen CB&I welded steel structures, ranging from digesters and liquor storage tanks to a 250,000-gallon Watersphere®, have played an important role in the increased output and further integration of Mead Corporation's 210-ton pulp mill at Chillicothe, Ohio.

The same specialized design, fabrication and erection services furnished by CB&I for this expansion program are being tendered *daily* throughout the paper and pulp industry. Write our nearest office for further details.

Cone-bottom blow tank equipped with cyclone separator; two liquor measuring tanks and 26-ft. liquor storage tank. All fabricated and erected by CB&I.



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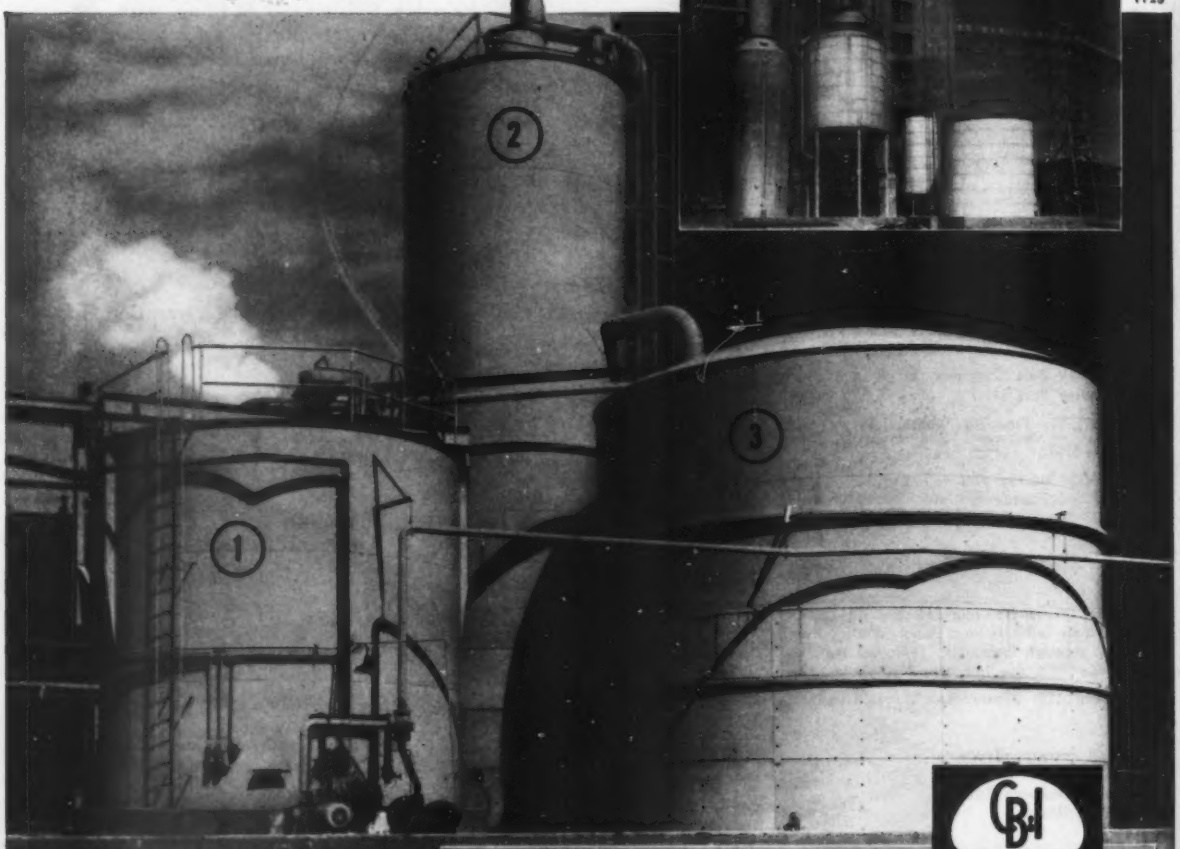

Some of the CB&I structures at this Mead mill include:
(1) 24-ft. diameter caustic liquor storage tank
(2) 15-ft. diameter by 50-foot high foam tank
(3) 26-ft. diameter black liquor storage tank

CB&I

Chicago Bridge & Iron Company

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From our point of view..

Why cost control?

The first response shown by many industries to a business recession is to drastically curtail all spending and so to speak "sit it out" for the duration of the recession in regard to expansion, development and promotion. It soon, however, becomes apparent that this is not the answer that is particularly beneficial to a modern industrial establishment, nor is it the solution advocated by the authors of a series of excellent papers presented at the 39th annual APPMSA convention (see pp. 235-237 in this issue).

A more intelligent approach to a business recession and to its accompanying slower tempo of industrial activity is to channel all spending in the direction that promises the highest return for the dollars spent. This would entail such spending as to provide for (1) a well-planned, all-out sales effort including all related activities such as advertising, promotion, technical sales, etc.; (2) adequate maintenance and replacement of worn-out equipment; (3) adequate research and development, which might even be accelerated when the research men are on the trail of a promising new product.

The main emphasis would naturally fall on a well-planned sales effort, with the view to streamlining this program to a point of maximum efficiency. Maximum efficiency here, of course, no longer implies the use of high-pressure sales tactics interspersed with a number of unsubstantiated claim. These have ceased to influence the enlightened customer of our times, who is primarily interested in facts and in the application of these facts to his problem.

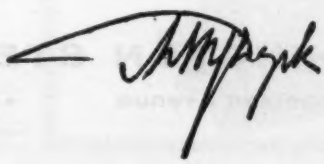
What is needed, therefore, is a sales organization thoroughly familiar with the company's products, with all their properties and applications, as well as an ability to convey this information to the customer.

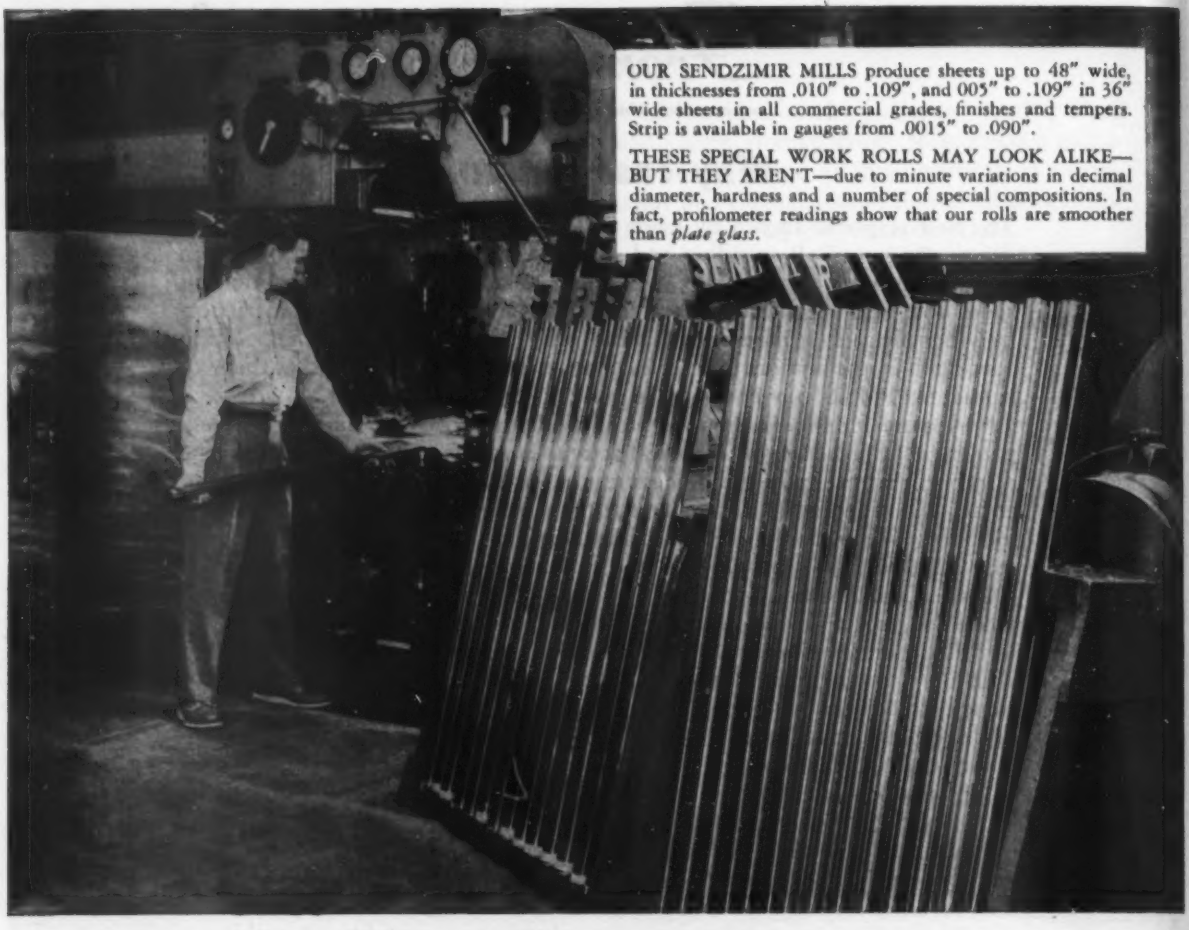
These requirements practically preclude the possibility of making a substantial number of sales after a single call. They give credence to Carl Chandler's contention that 80 per cent of all sales are made after the fifth call.

There is a general tendency to ignore cost control at the operating or production level when the market is good and the profits are high. It is for this reason that cost control at this level merits special attention, because it remains one of the most stabilizing factors to check the advance of a possible run-away inflation.

Cost control at the operating or production level is not a thing that should be switched off when times are good and switched on suddenly when times are bad. Only if carried out on a continuous basis can management hope to assign a definite value to it and treat it as a known quantity. Only if carried out as a continuous operation can cost control become highly effective — since its success at this level is largely dependent on employee attitudes that have to be properly conditioned through years of continuous training.

The "on-again, off-again" approach to cost control on the operating or production level can only lead to confusion, sacrifice of product quality and a general decrease in over-all productivity.





OUR SENDZIMIR MILLS produce sheets up to 48" wide, in thicknesses from .010" to .109", and 005" to .109" in 36" wide sheets in all commercial grades, finishes and tempers. Strip is available in gauges from .0015" to .090".

THESE SPECIAL WORK ROLLS MAY LOOK ALIKE—BUT THEY AREN'T—due to minute variations in decimal diameter, hardness and a number of special compositions. In fact, profilometer readings show that our rolls are smoother than *plate glass.*

It takes more than just a precision mill to produce STAINLESS STEEL *of MicroRold® quality*

...It takes Operating Know-How. Only Washington Steel, first to use Sendzimir sheet rolling, can offer you 10 years of practical experience with these mills.

Every hot-rolled stainless steel band has variations in thickness and surface characteristics which must be compensated for in the cold-reduction process to obtain precise gauge and flawless surfaces. To do this, special work rolls with minute diameter differences along the length of the roll are used in controlling such variations as crown, edge and camber. To accurately control all the possible variations requires a large number of these rolls, plus *highly skilled operators* who know from experience which rolls, speeds and reductions are required. These are but a few of important factors in quality rolling which can only be learned by *long* experience and association with precision mills.

Washington Steel is the only producer whose entire production stainless steel sheet and strip is rolled exclusively on the Sendzimir Mill.

WASHINGTON STEEL CORPORATION

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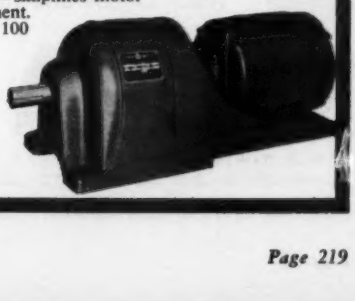
Maintains life-long alignment with flange-mounted NEMA motors

Here's a speed reducer right in step with industry's campaign for higher productivity in less space. Because its gear trains incorporate a minimum of parts . . . because its motor is directly connected to the gear drive with a flange—the Link-Belt Gearmotor is the ultimate in compactness.

Imagine how these same features cut costs. The flange connection eliminates additional coupling devices. Simple gear trains have fewer parts to wear, to service, to invite trouble.

You'll find them in Book 2447. Call your authorized Link-Belt stock-carrying distributor or nearby Link-Belt office.

LINK-BELT MOTOGEAR—for bracket-mounting all makes and enclosures of foot-type NEMA motors — simplifies motor replacement. Sizes to 100 hp.



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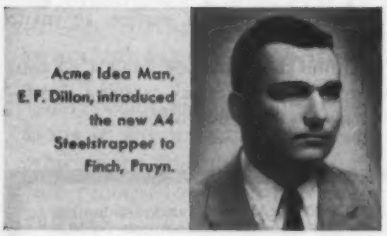
Full-power tool makes strapping faster, easier

POWER TENSIONING, POWER SEALING AND POWER CUTTING; now it's all done with the new A4, the first fully powered steel strapping tool! Finch, Pruyn and Company, Inc., Glens Falls, New York, manufacturers of printing and converting papers, is proving the advantages of the A4 Steelstrapper every day. (Idea No. S3-46)



Acme Idea Man, E. F. Dillon, introduced the new A4 Steelstrapper to Finch, Pruyn.

Both the A4 and a reel of Acme Steel Strapping are mounted on a traveling hoist that can be moved over any part of the strapping floor . . . nothing to carry; nothing to cart around. The A4 is easily operated on top of high skids and in other difficult-to-reach places. It can be used on small flat surfaces because of its short strap base.

One hand operates the A4. The operator presses one control and strap is air-power tightened to a pre-determined tension. He presses another on the same handle, and magazine-fed seals are crimped and the strapping is cut . . . without waste, without effort!

***Check your Acme Idea Man** for a demonstration of the new A4 and full information on various overhead mounting systems. Call the nearest Acme Steel Company office or write: Dept. PKS-78, Acme Steel Products Division, Acme Steel Company, Chicago 27, Ill. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

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ALBANY'S NEW IDEAS for better papermaking

Albany Service Engineer checks felt installation during startup of The Ruberoid Co.'s new 150" trim roofing felt machine at Gloucester City, N.J.

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AF

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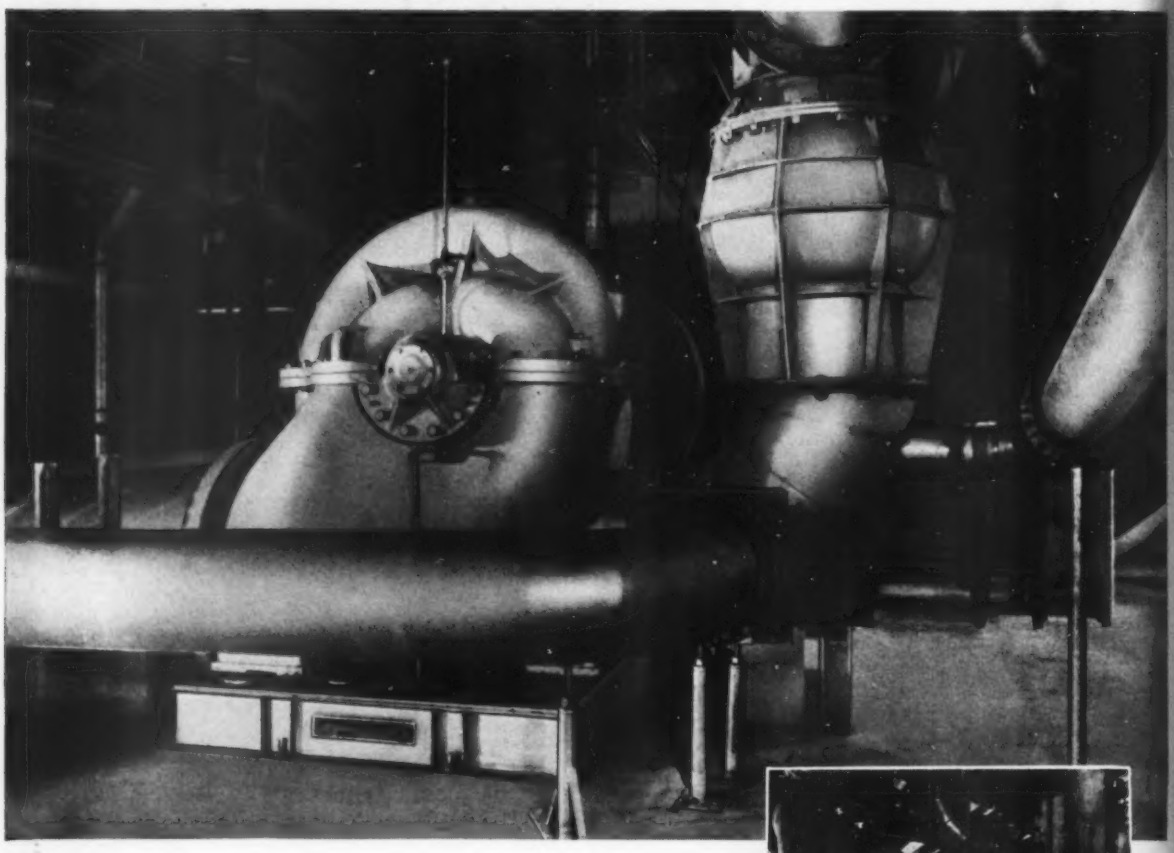
AT ST. REGIS PAPER COMPANY'S JACKSONVILLE EXPANSION . . .



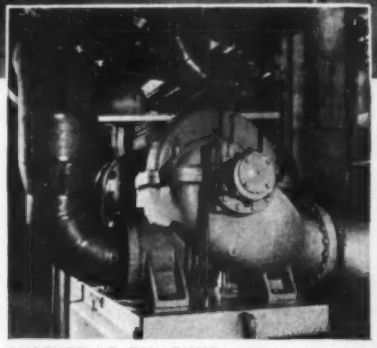
Huge I-R Fan Pump Feeds the "SEMINOLE CHIEF" 72 Million Gallons a Day!

ST. REGIS' giant new paper machine, affectionately named the "Seminole Chief," has an enormous appetite. For it's capable of producing more than 1000 tons of Kraft paperboard per day.

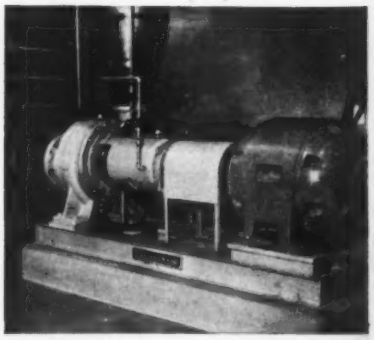
To feed this giant on a round-the-clock basis, St. Regis Paper Company installed the huge Ingersoll-Rand fan pump shown above. It has a 36-inch discharge and supplies the primary headbox with 50,000 gallons of stock per minute at 52′ TDH head.

At the Jacksonville plant expansion, more than thirty other I-R centrifugal pumps are performing a variety of vital liquid-moving jobs from handling stock to boiler-feed water.

For complete information on any centrifugal pump for any paper mill job, just call in your Ingersoll-Rand engineer.



ANOTHER I-R FAN PUMP supplies the secondary headbox of the "Seminole Chief," handling up to 10,000 gpm of stock at 72 ft discharge head.



I-R STOCK PUMP handles 3½% stock at 1375 gpm, 170 ft head, at St. Regis Paper Company's Jacksonville plant.

Ingersoll-Rand

10-861 11 Broadway, New York 4, N. Y.

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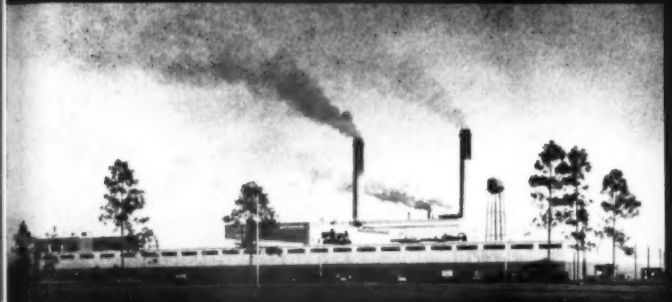
One MURCO 104" 10-knife Chipper



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Two MURCO 110" 10 knife Chippers;
Two MURCO Rechippers; One MURCO Wood splitter;
One MURCO Stock Sampler

MURCO

Heavy Duty Equipment!

ST. REGIS PAPER COMPANY, Jacksonville, Florida
Two MURCO 90" 10-knife Chippers;
Two MURCO 104" 10-knife Chippers

CRANDON PAPER MLLS, Fort Madison, Iowa
One MURCO 104" 12-knife Chipper;
One MURCO 40" 6-knife Rechipper

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MANUFACTURING CO.
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Feature articles

American Box Board's new mill at Filer City

A. W. J. DYCK

▶ The $17,750,000 mill, featuring a variety of papermaking equipment with mechanical and technical improvements, is designed to produce a daily 150 tons of high-quality bleached kraft paperboard.

AMERICAN BOX BOARD Co.'s new $17,750,000 mill at Filer City, Mich., designed to produce 150 daily tons of high-quality bleached kraft paperboard, marks the third in a series of major expansion moves the company has made at this site since 1947. The new mill, according to Gordon B. Bonfield, senior vice president and general manager, will convert annually some 100,000 cords of pine and 20,000 cords of aspen pulpwood into paperboard, thereby doubling pulpwood consumption in lower Michigan.

The food industry, i.e., frozen foods, dairy, etc., will be the primary market for ABB's output of bleached paperboard, although a considerable tonnage will also be used as packaging material for cigarette boxes, cups, plates, etc.

The equipment installed in the new mill is of the latest design incorporating many new mechanical and technical improvements to make this mill one of the most modern and outstanding developments in the world.

The mill's current daily consumption of water, fuel and raw materials amounts to 36,000,000 gal. of water, 550 tons of coal, 60 tons of soda ash, 40 tons of lime, 14 tons of sulfur, 15 tons of chlorine and smaller quantities of sodium chlorate, sodium hydroxide, sulfuric acid and methanol.

Chip preparation

Pulpwood is debarked at the rate of 20 cords per hour in three mechanical debarkers equipped with infeed and outfeed conveyors. Three log-feeders with built-in trash conveyors handle logs from the loading section to the barker infeed conveyors.

Bark from the refuse conveyor, barkers, infeed and outfeed conveyors and spike roll conveyors is handled by three 20-in. wide inclined belt conveyors operating at 200 fpm and delivering bark to a main 24-in. wide collecting refuse belt and a cross re-

W. S. Goodspeed
President

G. R. Bonfield
Sr. V.P. & Gen. Mngr.

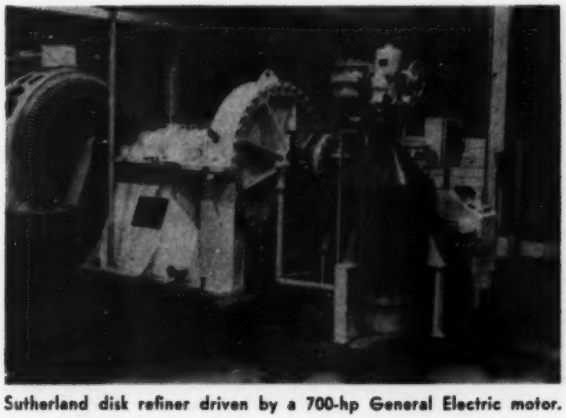
G. Dlesk
V. P. & Res. Mngr.

(L to R) R. Wilson, asst. plant engineer; Don Voigts, tech. asst. to the res. manager; B. McMahon, production manager, and D. Elliott, plant engineer.

View of Cambio and Impco mechanical debarkers with infeed and outfeed conveyors.

Link-Belt rotary feeder proportions pine and aspen chips into belt conveyor.

One of five Impco washers in the bleach plant; also seen is a section of plastic pipe.



Sutherland disk refiner driven by a 700-hp General Electric motor.

Black-Clawson No. 5 Miami jordans.

Bauer Bros. Centri-Cleaners, which remove 70-90% of all visible dirt.

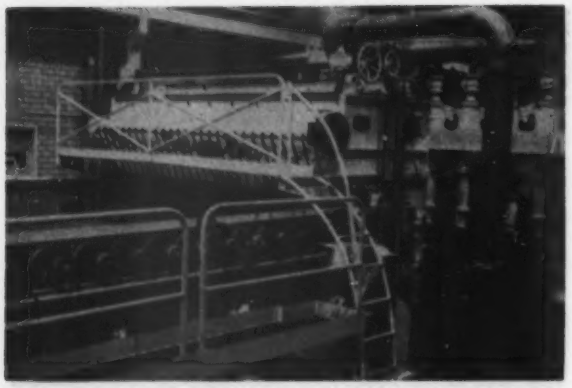
fuse conveyor that discharge to the hog. A refuse conveyor consisting of H-480 Promel chain driven by a 5-hp motor takes the bark from the hog to the pneumatic bark conveyor.

A log transfer conveyor consisting of four matched strands of 4-in. pitch chain, one lift section transfer conveyor consisting of four strands of H-78 plain malleable iron chain and a log conveyor operating at a speed of 179 fpm move the barked logs from the outfeed conveyors to the 90-in. 10-knife chipper.

The chipper, capable of chipping 30-35 cords of pulpwood per hour, is driven by a 500-hp, 900-rpm slip ring motor through 38-in. and 30-in. dia. pulleys and a 28-in. flat belt. A 40-in. rechipper equipped with blower housing and driven by a direct-connected 15-hp induction motor receives reject chips from two Model 52 Rotex chip screens via a 20-in. wide belt conveyor.

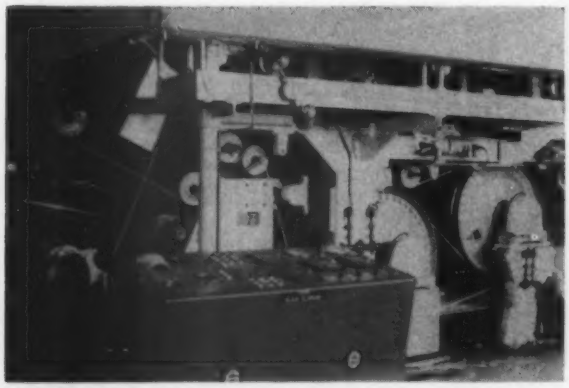
A 26-in. dia. by 62-in. long rotary chip feeder handles pine and aspen chips to the screens at the rate of 4700 cu. ft./hour.

Accepted chips from the Rotex screens pass to a drag flight conveyor



Valley Iron Works 56-in. × 166-in. inlet-headbox is stainless steel-lined.

Black-Clawson press section with two suction presses and a smoothing press.



Black-Clawson air-knife coater installed between two calender stacks.

Beloit Iron Works Model M winder with two individually-driven 18-in. drums.

Maxson Automatic Machinery continuous run layboy with PIV drive.

Black-Clawson short center V-belt drive.

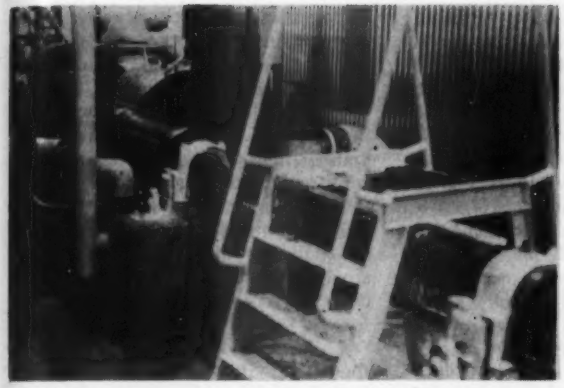
and then to two 24-in. belt conveyors that discharge into a pneumatic system that carries chips to the aspen and pine chip bins.

Two 26½-in. dia. rotary chip feeders at the bottom of the pine and aspen chip bins, driven by separate variable speed drives, serve as a chip proportioning system. The rotary chip feeders have a capacity of 17,000 cu. ft./hour of pine and 6000 cu. ft./hour of aspen chips. American Box Board has found that cooking a mixture consisting of 25 per cent aspen chips and 75 per cent pine chips does not adversely affect pulp quality.

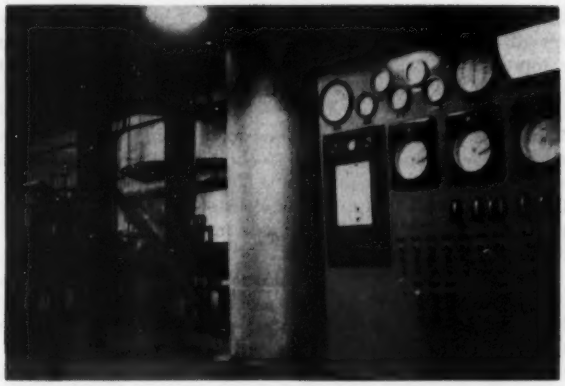
A 21,000-cu. ft./hour capacity 36-in. wide troughing belt conveyor then carries the chips from the rotary feeders to a double-row 24-in. by 10-in. centrifugal discharge double-leg elevator, which discharges to a 36-in. wide troughing belt conveyor equipped with a belt-propelled tripper.

Chip digestion

Chips are digested in three 3300-cu. ft. capacity 12-ft. inside dia. digesters, each equipped with a heat exchanger containing 900 sq. ft. of heat transfer



Worthington Corp. 750-hp turbine with reduction gear.



Bailey Meter instruments control recovery furnace.

Babcock & Wilcox 300-ton recovery furnace produces 138,000 lb. steam/hr.

Shot cleaning equipment for economizer on Babcock & Wilcox recovery furnace.

General Electric 7500-kw turbo-generator.

Goulds 4500-gpm pumps in effluent pump house.

area. The heat exchangers are of the vertical, two-pass, fixed tube sheet design. All metal parts in contact with the liquor are cast Esco alloy 40-s (18-8 stainless) and wrought T-304.

Each digester is controlled from an individual cabinet unit containing standard kraft digester control instruments. Pumps and other major operating equipment are regulated by means of panel-mounted push buttons, etc.

At the completion of the digestion cycle, pulp is blown into a 70½-ft. by 24-ft. dia. blow tank equipped with agitator. Desired stock consistency in the blow tank is maintained by a consistency controller, which senses the motor load on the agitator and accordingly regulates the flow of dilution liquor into the bottom of the tank.

After passing through a 14 by 16 vibratory knotter, pulp is washed in two (one 11½- by 16-ft. and one 8- by 16-ft.) brown stock vacuum washers and pumped to high-density brown stock storage.

It is then pumped through a No. 2 pipeline consistency regulator to a Cowan Mark A centrifugal screen equipped with mild steel plates, rub-

ber-covered steel rotor and epoxy-coated interior. The screen, driven by a top-mounted 100-hp 900-rpm motor through V-belts, has a capacity of 240 tons/day at an inlet consistency of ¾-1 per cent. Accepted stock goes to a decker and then to a decker chest, while rejects are dewatered in a Type 008 Zenith press to approximately 35-per cent consistency and channeled into the N.S.S.C. pulping system.

Pulp screening is completely operated from the control panel, which has provision for manual remote operation of important valves, motor starters, etc. An indicating ammeter measures stock consistency in high-density storage tanks, while indicating and recording level control in the tank is equipped with an alarm system to warn the operator when the tank is full.

Bleach plant

The pulp bleaching system, which bleaches to 85-90 per cent brightness, includes five bleaching stages: chlorination in a 12½- by 68-ft. chlorination tower; caustic extraction in a 11½- by 40½-ft. caustic tower; first chlorine dioxide treatment in a 16½- by 46-ft. ClO_2 tower; caustic extraction in a 11½- by 40½-ft. caustic tower, and second chlorine dioxide treatment in an 18- by 46-ft. Cl O_2 tower. Following each bleaching stage, pulp is washed first in an 8-ft. dia. by 14-ft. vacuum washer, followed by four 8-ft. dia. by 14-ft. vacuum washers.

A number of No. 1 consistency regulators and liquid level control valves regulate consistency and flow of the stock from the washers.

A master control panel provides master records of major variables throughout the bleach plant. In addition, there are individual control panels for each tower and washer. This permits each tower to be operated individually while over-all information is recorded at the master panel.

Incoming stock to the bleach system is measured by a magnetic flow meter, which also automatically feeds chlorine to the first tower. Other bleach liquors, including chlorine dioxide, are also measured and automatically controlled by magnetic flow meters.

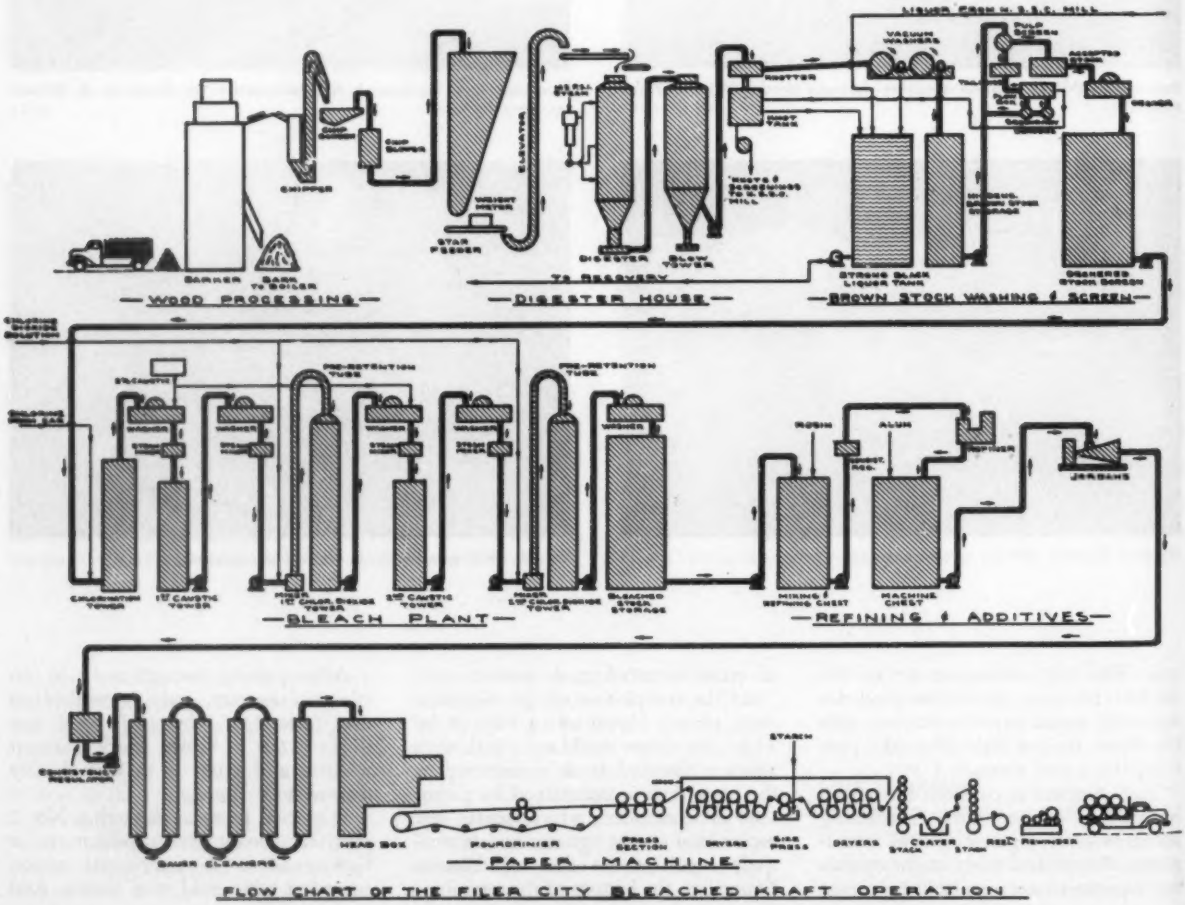
The bleached stock is conveyed at 13-per cent consistency by a 24-in. wide flat slider belt conveyor to the high-density bleached stock storage tank where its consistency is measured in terms of the motor load on the agitator, and dilution to the required consistency is made accordingly.

In the manufacture of caustic extraction liquor, the strong caustic is automatically diluted to the desired strength by a Dynalog conductivity controller calibrated in per cent caustic soda.

Chlorine dioxide is generated by the Solvay process in two Ferrolum lead-clad steel reactors into which the various chemicals are measured by Pulsafeeders. These are driven by a common motor and equipped with manually-set ratio mechanisms for the individual pumps.

Chemical recovery system

The $2,500,000 chemical recovery plant features an LTV sextuple-effect evaporator, a 300-ton recovery furnace producing 138,000 lb. of steam/hour, a glass-coated smoke stack, a wet-bottom electrostatic precipitator, a re-



FLOW CHART OF THE FILER CITY BLEACHED KRAFT OPERATION

causticizing system and various liquor and storage tanks.

Strong black liquor from the washers is concentrated to 55-per cent solids in the evaporators and stored in a 19½- by 34-ft. heavy black liquor tank. From here it is pumped to the bottom of the precipitator, where it dissolves the solids recovered from the flue gases. The precipitator has a capacity of 120,00 cfm at 300° F operating at a 95-per cent efficiency.

Instrumentation for the evaporators is designed to measure the rise in boiling point with the changing density of concentrated liquor, and to automatically control the flow of the strong black liquor to the various effects.

An interesting aspect of evaporator instrumentation at this mill is the recording in different colors of temperature differences across each effect, instead of recording the various temperatures through the system. This is said to simplify the operators' job of knowing at all times the condition of each effect. Evaporator instrumentation also includes an arrangement whereby a conductivity controller will automatically divert evaporator condensate to the sewer when contamination is detected.

From the bottom of the precipitator black liquor is pumped and sprayed into the cyclone evaporator, where it is concentrated to 65-per cent solids and then sprayed into a two-drum black liquor recovery furnace designed for a pressure of 650 psi and a temperature of 750° F at the superheater outlet. The black liquor recovery furnace is also equipped with an economizer. Feedwater temperature to the economizer is 370° F.

The black liquor recovery furnace is equipped with a system of automatic sequentially-operated air motor-driven and controlled soot blower units. This system includes ten Model IK long travel retractable units, with each unit covering the entire 18-ft. 5-in. furnace width, and two Model G9B units equipped with plain steel elements. The blowers use 600 psi, 750° F steam.

The smelt from the recovery furnace is dissolved in a smelt dissolving tank and then pumped to a conventional recausticizing system consisting of a No. 6 lime slaker, three No. 9 causticizers, a 20-ft. dia. by 24-ft. white liquor clarifier, a 22-ft. dia. by 24-ft. lime mud washer, three No. 3 VM suction pumps, two No. 2 VM suction pumps, a 26-ft. dia. by 24-ft. green liquor clarifier, a 7-ft. dia. by 6-ft. dregs mixer, an 18-ft. dia. by 10-ft. dregs washer, a 14-ft. dia. by 14-ft. lime mud storage tank equipped with agitator, a 1½-in. Type "L" filtrate pump, four valve assemblies, two 4-ft. dia. by 4-ft. lime mud sump tanks and a 6-ft. dia. by 4-ft. Type 14 FIC lime mud filter.

Lime is burned in an 8-ft. dia. by 140-ft. long kiln equipped with fuel oil pumping and heating system, kiln induced draft fan and a scrubber.

A 24-in. wide water-jacketed flight conveyor handles about 6000 lb./hr. of burned lime at 1800° F from the lime kiln to a 10-in. by 6-in. centrifugal discharge bucket elevator, which dumps it into the burned lime storage tank. A 9-in. dia. variable speed screw feeder, operating in a 12-in. dia. dust-tight trough, conveys lime from the storage tank to the lime slaker at a maximum rate of 6000 lb./hr.

Clarified green liquor from the recausticizing system is sulfited with sulfur dioxide in a tile-lined tower and then pumped to the neutral sulfite semichemical operation. A unique feature of the kraft digestion process at this mill is the use of soda ash and sulfur instead of salt cake for make-up of cooking liquor.

Paper machine area

From the bleached stock storage tank stock is pumped to the mixing and refining chest where rosin is added. It then passes through a No. 2 consistency regulator equipped with overflow and stuffgate to a disk refiner driven by a 700-hp motor and then to the machine chest. From here it is pumped to two No. 5 Miami jordans, then through a No. 1 consistency regulator into the suction of a 7800-gpm fan pump that pumps it to 12 Centri-Cleaners located immediately ahead of the machine headbox. The cleaners remove from 70-90 per cent of all visible dirt.

Ten No. 623-4 Centri-Cleaners each with a capacity of 650 gpm are in the primary stage and receive stock at 70-psi pressure and at a consistency of 0.5-1 per cent. The accepted stock is piped directly into the machine headbox. The rejects from the primaries are pumped by a 750-gpm pump at 0.56-per cent consistency to an identical Centri-Cleaner in the secondary stage at an inlet pressure of 53 psi.

A No. 622 Centri-Cleaner with a capacity of 220 gpm in the third stage receives the rejects from the secondary cleaner at 0.1-per cent consistency and 52-psi inlet pressure.

The inlet headbox and flow manifold combination has a fully adjustable inlet. The latter is close-coupled with a one-pass headbox. All internal surfaces of the headbox are of stainless steel. All slice adjustments both vertical and horizontal can be made while the machine is running. The inlet is further equipped with a horizontally-adjustable apron, an auxiliary slice and a variable speed distributing roll.

The cantilever type fourdrinier has a 172-in. wire, eight suction boxes, a 27-in. dia. lump breaker roll, an 18-in. dia. dandy roll, a suction couch roll and two "Vibro-Flyte" 500-in. shake units.

The fourdrinier is followed by two suction presses with 28-in. dia. rubber-covered rolls and a smoothing press with a 27-in. dia. microroc-covered bottom roll and a 28-in. dia. rubber-covered top roll.

The dryer section consists of 47 cylinders that are 60 in. in diameter. The size press has a 27-in. dia. microroc-covered bottom roll and a 28-in. dia. rubber-covered top roll.

At the end of the dryer section are two eight-roll calender stacks separated by an air-knife coater equipped with four 48-in. dia. drying cylinders.

The coating dispersion for the coater is prepared on a Model 4BH-60 Kady mill and screened on two vibrating coating screens. The Kady mill charges dry clay directly into the liquid phase of the coating and is capable of dispersing in 20 min. up to 1500 lb. of pigment, clay or clay/titanium, producing a mixture containing up to 70 per cent solids. The advantage of the Kady mill lies in the fineness and uniformity of the dispersion, increased gloss and opacity and a saving on adhesives.

The coating screens are the 18-in. dia. and the 30-in. dia. one-deck Sweco Separators equipped with 60-mesh and 80-mesh screen cloth respectively.

Following the last calender is an Autoflyte-36 super uniform-speed reel and a Model M winder equipped with two 18-in. dia. drums, which are individually driven.

Dryer and drainage control is provided as a packaged system consisting of differential pressure transmitters and controllers, pressure controllers, temperature controllers, level controllers, control valves, separators, condenser, condensate and vacuum pumps.

Vacuum is provided by seven vacuum pumps as follows: a 900 by 14 pump for the suction boxes; a 787 by 17 pump for the felt conditioners, each of which features four jordan-type shoes; three compound vacuum pumps, first stage 121 by 20, second stage 300 by 20 for the suction couch; and two compound vacuum pumps, first stage 105 by 25, second stage 300 by 20 for the suction presses.

The machine drive consists of a 750-hp turbine (equipped with reduction gear), a line shaft and short center V-belt drive.

Principal equipment installed at A. B. B.'s Filer City mill

Principal Engineering and Designing Consultant: Sandwell & Co. Inc.

Chip preparation

Bark conveyor, pneumatic ..... Rader Pneumatic Inc.
Bark conveying system, belt, 20-in. and 24-in. wide ..... Link-Belt Co.
Chip conveying system, pneumatic ..... Rader Pneumatic Inc.
Chip conveying system, drag flight and belt ..... Link-Belt Co.
Chip proportioning system, two 26½-in. dia. rotary feeders 17,000 cu. ft. and 6,000 cu. ft. cap. ..... Link-Belt Co.
Chip screens (2), Model 52 Rotex ..... Orville Simpson Co.
Chipper, 90-in., 10-knife ..... D. J. Murray Mfg. Co.
Debarker, mechanical ..... Improved Machinery Inc.
Debarkers, 21-in. Cambio, with infeed and outfeed conveyors ..... Soderhamn Machine Mfg. Co.
Hog ..... Diamond Iron Works
Log conveying system, 4-strand and single chain ..... Link-Belt Co.
Metal detector ..... Dings Magnetic Separator Co.
Rechipper, 40-in., 6-knife ..... D. J. Murray Mfg. Co.
Weightometer ..... Merrick Scale Mfg. Co.

Chip digestion

Blow tank 24-ft. × 70½ ft. ..... Chicago Bridge & Iron Co.
Blow tank agitator ..... James Brinkley Co.
Digesters (3), 3,300 cu. ft. cap. each ..... Chicago Bridge & Iron Co.
Digester heat exchangers (3), vertical, two-pass, 900 sq. ft. heat transfer area each ..... Electric Steel Foundry Co.
Digester circulating pumps ..... Fibre Making Processes Inc.
Heating and ventilating system ..... J. O. Ross Engineering Corp.
Instrumentation ..... Foxboro Co.
Pumps, centrifugal ..... Allis-Chalmers Mfg. Co.
Tanks (2), black and white liquor ..... Buffalo Tank Corp.
Tank, tile-lined, hot water ..... Stebbins Engineering & Mfg. Co.
Turpentine recovery system ..... Swenson Evaporator Co.

Brown stock washing and screening

Agitators (3), decker chest, knot tank, and brown stock tank ..... James Brinkley Co.
Centrifugal screens (2) ..... Improved Machinery Inc.
Consistency regulator, No. 2 pipeline ..... DeZurik Corp.
Cowan screen, Mark A, epoxy-coated interior ..... Appleton Machine Co.
Decker chest, tile construction ..... Stebbins Engineering & Mfg. Co.
Instrumentation ..... Foxboro Co.
Knotter, vibratory, 14 × 16 ft. ..... Improved Machinery Inc.
Pumps, centrifugal ..... Allis-Chalmers Mfg. Co.
Screw press, Type 008 Zenith ..... E. D. Jones & Sons Co.
Tanks, filtrate and foam ..... Chicago Bridge & Iron Co.
Tanks, white water, tile construction ..... Stebbins Eng. & Mfg. Co.
Vacuum filter, 8-ft. dia., tile vat ..... Improved Machinery Inc.
Washers (2), 11½- × 8-ft. ..... Improved Machinery Inc.
Washer hood system, transite ..... J. O. Ross Eng. Corp.

Bleach plant

Agitator and oscillating nozzle for high density tank ..... James Brinkley Co.
Air blower, 450 × 8 .... Read-Standard Div., Capitol Products Corp.
Bleached-stock conveyor, flat slider belt ..... Link-Belt Co.
Bleaching towers (5), 1 chlorine, 2 chlorine dioxide and 2 caustic ..... Chicago Bridge & Iron Co.
Chlorine dioxide reactors (2), Ferrolum lead-clad ..... Knapp Mills Inc.
Consistency regulators, No. 1 ..... DeZurik Corp.
Heating, ventilation and hoods ..... J. O. Ross Eng. Corp.
High-density stock storage tank, tile construction ..... Stebbins Eng. & Mfg. Co.
Instrumentation ..... Foxboro Co.
Liquid chiller ..... Worthington Corp
Magnetic flow meters ..... Foxboro Co.
Mixers, line, steam and chlorine dioxide .... Improved Machinery Inc.
Pumps, centrifugal ..... Allis-Chalmers Mfg. Co.
Pumps, centrifugal ..... Goulds Pumps Inc.
Pulsafeeders ..... Lapp Insulator Co. Inc.
Tanks, methanol, sodium chloride and sulfuric acid storage ..... Buffalo Tank Corp.
Tanks, chlorine dioxide and sodium chlorate ..... Chicago Bridge & Iron Co.
Tile lining, tanks and towers ..... Stebbins Eng. & Mfg. Co.
Washers (5), 1 chlorination, 2 chlorine dioxide and 2 caustic ..... Improved Machinery Inc.

Chemical recovery

Conveying equipment, hot lime handling ..... Link-Belt Co.
Cyclone evaporator ..... Babcock & Wilcox Co.
Evaporators, LTV, sextuple effect ..... Swenson Evaporator Co.
Evaporator pumps ..... La Bour Co. Inc.
Glass-lined smoke stack ..... A. O. Smith Corp.
Instrumentation, recovery ..... Bailey Meter Co.
Instrumentation, evaporators and recausticizing plant ..... Foxboro Co.
Kiln, 8-ft. dia. × 140 ft. ..... Vulcan Iron Works
Precipitator, electrostatic, wet bottom ..... Research-Cottrell Inc.
Pumps, recovery ..... Worthington Corp.
Pumps, centrifugal ..... Allis-Chalmers Mfg. Co.
Recausticizing system consisting of No. 6 lime slaker, three No. 9 causticizers, white liquor clarifier, lime mud washer, five suction pumps, green liquor clarifier, dregs mixer, dregs washer, lime mud storage tank, lime mud sump tanks, etc. ..... Dorr-Oliver Inc.
Recovery furance, 300-ton, 138,000-lb. steam/hr. equipped with superheater and economizer ..... Babcock & Wilcox Co.
Scrubber, on lime kiln ..... Peabody Eng. Corp.
Soot blowing system, automatic, sequentially-operated ..... Diamond Power Specialty Corp.
Tanks (8), two strong black liquor storage, 40-ft. dia. × 40-ft.; one heavy black liquor, 19½-ft. dia. × 34-ft.; white liquor storage, 32-ft. dia. × 24-ft.; weak wash liquor storage, 32-ft. dia. × 24-ft.; clarified green liquor storage, 20-ft. dia. × 30-ft.; raw green liquor storage, 20-ft. dia. × 30-ft.; elevated burned lime tank, 15-ft. dia. × 30-ft. ..... Chicago Bridge & Iron Co.
Tanks (4), green liquor retention, lime mud sump, soda ash, limestone chip storage ..... Buffalo Tank Corp.

Paper machine area

Air system, supply and exhaust systems, totally-enclosed hood, motor ventilation, calender cooling, trim conveying, etc. ..... J. O. Ross Eng. Corp.
Broke conveyor ..... James Brinkley Co.
Centri-Cleaners (12), 11 No. 623-4 and 1 No. 622 ..... Bauer Bros. Co.
Coating screens (2), vibrating, 18-in. and 30-in. dia. ..... Southwestern Engineering Co.
Consistency regulators, No. 1 and No. 2 pipe line ..... DeZurik Corp.
Cranes (2), 20-ton each ..... Manning, Maxwell & Moore Inc.
Disk refiner, driven by 700-hp GE motor .... Sutherland Refiner Corp.
Felt conditioners, Vickery, with 4 jordan type shoes ..... Bird Machine Co.
Fan pump, 7800 gpm ..... Allis-Chalmers Mfg. Co.
Headbox, inlet-headbox and flow manifold combination, stainless steel-lined ..... Valley Iron Works Co.
Hydrapulper, 15-ft. dia., equipped with 66-in. dia. rotor and 36-in. dia. regulating box ..... Black-Clawson Co.
Instrumentation ..... Foxboro Co.
Jordans (2), No. 5 Miami ..... Black-Clawson Co.
Kady mill for coating color preparation, Model 4B4-60 ..... Kinetic Dispersion Corp.
Paper machine, including fourdrinier with 172-in. wire, 3 presses, 47 dryers, size press, 2 calander stacks, air-knife coater, Autoflyte reel ..... Black-Clawson Co.
Paper machine drive, short center V-belt ..... Black-Clawson Co.
Pumps, stock and white water ..... Allis-Chalmers Mfg. Co.
Savealls, stainless steel ..... Black-Clawson Co.
Steam supply, condensate removal, and controls ..... Mason-Neilan Div., Worthington Corp.
Turbine with reduction gear, 750-hp, on paper machine drive ..... Worthington Corp.
Vacuum pumps (7) ..... Read-Standard Div., Capitol Products Corp.
Winder, Model M, with two 18-in. dia. drums individually driven ..... Beloit Iron Works
Winder drive, V-S drive ..... Reliance Electric & Eng. Co.

Electric power and steam supply

Bark burling boiler ..... Riley Stoker Corp.
Cables, feeder, 24,000-ft. ..... Okonite Co.

Surface condenser, two-pass, 8000-sq. ft., equipped with "Tubejet" air ejector and pumps	C. H. Wheeler Mfg. Co.
Switch-gear, high-voltage, 4 unit metal clad	General Electric Co.
Turbo-generator, 9375 KW, automatic-controlled extraction at 180 psi and 60 psi	General Electric Co.
Unit substations (6)	General Electric Co.

Finishing area

Continuous run layboy equipped with rotary sheet cutter, 4 pairs of ball-bearing slitters, P. I. V. drive and continuous running piler (See also ad on page 243)	Maxson Automatic Machinery Co.
Cutter, heavy-duty, single	Hamblet Machine Co.
Roll header, 72- × 80-in., semi-automatic with 72-in. dia. platens	Valley Iron Works Co.
Roll wrapper	American Mfg. Co.
Scale, platform, 14,500-lb. cap.	Fairbanks, Morse & Co.
Slitter-rewinder, TSD-12	Black-Clawson Co.
Trimmer, Model 100, with hydraulic clamp, knife action and back gauge	Harris-Seybold Co.
Truck, roll-grab type	Yale & Towne Mfg. Co.

Water supply

Accelator	Infilco Inc.
Chlorination system	Wallace & Tiernan Inc.
Gate valves	Armco Drainage & Metal Products Inc.
Gate valves	Crane Co.
Pumps	Food Machinery & Chemical Corp.
Pumps	Peerless Pump Div., Food Machinery & Chemical Corp.
Pumps	Allis-Chalmers Mfg. Co.
Water screens	Link-Belt Co.

General

Concrete pressure pipe, 30-in., 4½ miles	American-Marietta Co.
Motors, electric	General Electric Co.
Motors, electric	Allis-Chalmers Mfg. Co.
Motors, electric	Louis Allis Co.
Motors, electric	Electric Machinery Mfg. Co.
Motors, electric	Marathon Electric Mfg. Co.
Pumps, fuel oil	DeLaval Steam Turbine Co.
Pumps (3), 4500 gpm, effluent disposal	Goulds Pumps Inc.
Pipe, valves and fittings	Crane Co.
Pipe, valves and fittings	Armco Drainage & Metal Products Inc.
Pipe, valves and fittings	Grinnell Co.
Valves	Fabri-Valve Co. of America
Valves	DeZurik Corp.

Air systems

The air systems in this mill comprise an integrated arrangement and provide a complete balance of filtered air. A total of 36 fans are in operation.

The totally-enclosed machine hood constructed of insulated aluminum panels constitutes the largest of the air systems. Exhaust from the hood is handled by two fans, one at the wet end and one at the dry end. The two machine air supply systems include automatic filters, economizers, felt drying and machine air systems.

Exhaust volume from the hood is automatically controlled through dew point controllers to permit operation with maximum steam economy at varying machine production rates. For further steam economy, make-up air supply to the hood is heated in the economizers, which utilize the heat in the exhaust. Additional heating of make-up air is accomplished by steam coils equipped with automatic temperature control.

The machine room roof air system comprises two supply units complete with automatic filters. Exhaust fans are provided at the back side of the wet end section of the machine to remove moisture generated at that point.

Two large air make-up and ventilating systems are provided for the brown stock and bleach plant areas, where transite hoods are installed over the chlorine dioxide generator, brown stock washers and chlorine dioxide washers.

Finishing area

Equipment in the finishing area includes a roll wrapper, 72- by 80-in. roll header, a TD-12 slitter-rewinder, roll-handling equipment, a platform scale of 14,500-lb. capacity, a heavy-duty single cutter, a continuous run layboy, a Model-100 trimmer and a roll grab truck.

An interesting piece of equipment in the finishing area is the continuous run layboy, a high-speed sheeting and piling unit. It is equipped with water-cooled brakes to apply constant tension to the steel shafts, a rotary sheet cutter with slitter attachment that has four pairs of ball bearing slitters of the shear type, a 26-in. dia. revolving knife, a P. I. V. drive on the cutter to regulate sheet length and a continuous running piler that stacks a maximum of three piles at a time.

The piler is equipped with a motor to raise the pile-table and an automatic pile-lowering device. It is designed to deliver sheets in overlapped form, permitting variation of percentage of overlap while running. The unit is driven by a 30-hp motor equipped with dynamic braking. It has a speed ratio variation of 8:1.

Another interesting piece of equipment is the semi-automatic roll header equipped with 72-in. dia. platens that feature vacuum attachment and an automatic time cycle with adjustable pre-set. All the operator has to do is place the heads on the platens and the roll in the header. He then presses a button that activates the heads—to automatically hold them in position, retract them and subsequently eject the roll from the header.

The new 100-in. automatic mill trimmer features hydraulic clamp, hydraulic knife action, and hydraulic back gauge—permitting precise and versatile control of positioning, application of uniform, cushioned pressure to the pile, reduction of wear on the machine and knife.

Electric power generation

Electric power is generated by a 9375-kw turbo-generator, with automatic-controlled extraction at 180 psi and 60 psi.

The power distribution system includes six unit substations (one 500-kva; one 1000-kva; and four 1500-kva) with Pyranol transformers and high-voltage switchgear.

The turbo-generator is served by an 8000-sq. ft. cylindrical, two-pass condenser designed to condense 85,000 lb. of steam/hour. A "Tubejet" air ejector on the condenser is designed to operate at 350 psi and 750°F. It features two first stages and two second stages, which are arranged with cut-out valves.

Two 6000-gpm 20- by 16-in. single-stage horizontally split case double suction pumps supply condenser cooling water, while condensate is removed by two 250-gpm 6- by 3-in. two-stage horizontally split case double suction pumps.

Water supply

Water is passed from the river through a water screen and then pumped to a 70-ft. dia. 19½-ft. deep Accelator clarifier and sand filters. The Accelator has a capacity of 8750 gpm and is designed for additional later use as a water softener.

Effluent disposal

Three 4500-gpm pumps driven by 200-hp motors pump the mill effluent through 30- and 24-in. prestressed concrete steel cylinder pressure pipe over a distance of 4½ miles reaching into Lake Michigan. The effluent pipeline, reaching 1100 ft. into the lake, ends there with a diffuser system that consists of six separate distribution channels.

The use of pipe, fittings, valves and pumps in the pulp and paper industry

ROLAND L. ALLEN JR.
Vice President, Eastern Engineering Co.

Part II—Discussion of valves: available types and materials

MOST PIPING SYSTEMS require valves to regulate the flow in the system. This regulation might be for safety or for process control and might be in the form of shut-off or flow modulation.

Although "valves", in the general sense, include various types of automatic as well as manually-operated valves, we will limit our discussion to the manually-operated group since control or automatic valves are, in reality, components of process instrumentation. This does not mean that most of the manually-operated valves cannot be adapted for remote or automatic operation, because practically any valve can be fitted with a mechanical, electric, hydraulic or pneumatic operator, and frequently it is advantageous to do so. This is often done in case a manual valve must be located in an inaccessible place. The valve is equipped with an appropriate operator and remotely operated from a manually-set drive.

Cost of valves

In a complete pulp and paper mill the installed cost of valves amounts to some 20-30 per cent of the total piping cost, and where more than the average number of valves are used the percentage can be even higher. These percentages are based on the installed cost of the valve, which includes the cost of the valve, labor for installing the valve, flanges required in the piping to accommodate the valve if it has flanged end connections, welding material and labor, gaskets, bolts and nuts, etc. Table I will give an idea of the part valves play in the piping cost picture.

A comparison of the above figures with typical installed costs for 100 ft. of ASTM-A-53 seamless black steel pipe of standard weight complete with all labor and material costs for pipe, hangers, welding, etc., but without any fittings or flanges, will give additional indication of the relative cost of valves (Table II).

Since it is evident that valves are a very costly part of the piping system, it is desirable that every effort be made to hold the valve cost to a minimum consistent with good engineering practice, satisfactory system operation and maintenance expense. This can be done by (1) using only as many valves as are needed for satisfactory system operation and safety; (2) using the cheapest valve that will do the job so long as it meets code requirements for the particular service and so long as its use will not increase the maintenance cost or cause loss of production, and (3) using a type of valve that will give the lowest installed cost possible.

The elimination of excess valves is probably the method that will effect the greatest reduction in costs. Probably every pulp and paper mill has valves that have never been used since being installed. One practice that greatly increases the over-all piping cost is that of providing by-passes around all control valves. This usually requires a stop valve on each side of the control valve plus a by-pass valve, or a total of three additional valves. It is not possible to eliminate the by-passing of all control valves since in some cases control valve failure could produce disastrous results, and in other cases the service conditions are so severe that the dependability of the control valve is greatly reduced, and production losses would be so frequent or so expensive that the additional cost of the by-pass valves would be justified. Less than 50 per cent of the control valves in a pulp and paper mill actually need by-passes.

There is some possibility of reducing costs by using cheaper valves, but this practice should be used with great caution since there is no savings if a cheaper valve causes higher maintenance cost, or if it must be replaced in a short time. By "cheaper valve" is meant a valve of lighter weight or cheaper material. For example, a 125-lb. cast iron bronze-trimmed valve can be used in 50-psig, 450°F or less steam service at a substantial savings over a 150-lb. cast carbon steel stainless steel trim valve.

Where cast carbon steel valves are used, some 10-12 per cent can be saved by using weld end valves rather than flanged valves. The following table gives typical installed costs for weld end and flanged steel valves, taking into account all of the costs for each type of end construction:

Table I—Typical Installed Costs of 125-lb. Cast Iron Bronze Trim Flanged Gate Valves with Two Forged Steel 150-lb. Slip-on Flanges, Square Head Bolts with Hex Nuts and 1/16" Compressed Asbestos Gaskets Graphite-Coated

Size	Valve Cost	Valve Labor	Cost of Flanges	Labor for 2 Flanges	Welding for Flanges	Gaskets	Bolts and Nuts	Total Inst. Cost of Valves
2½"	34.29	18.88	6.56	3.78	17.94	.24	.74	82.43
3"	40.77	23.60	7.60	4.72	18.88	.28	.74	96.59
3½"	57.02	28.32	9.96	5.66	20.76	.42	1.48	123.62
4"	57.02	33.04	9.96	7.54	22.64	.44	1.48	127.40
5"	73.63	37.75	15.76	8.50	24.54	.52	2.01	162.71
6"	90.93	42.47	15.76	9.44	28.32	.58	2.16	189.66
8"	151.56	47.20	19.94	12.28	33.04	.80	2.16	266.98
10"	238.17	56.64	27.30	14.24	47.20	1.08	5.08	389.71
12"	337.77	66.07	47.28	16.98	66.08	1.66	5.08	540.92
14"	465.52	84.95	91.20	18.88	70.80	1.94	7.33	740.62
16"	645.94	94.39	113.66	23.60	94.40	2.50	7.33	981.82
18"	855.23	113.27	145.18	28.32	113.28	2.54	16.35	1,274.17
20"	1,270.23	132.15	185.80	33.04	141.58	2.58	21.00	1,786.38
24"	1,973.91	141.59	297.42	37.76	207.68	4.24	25.60	2,686.20

Table II

Size	Installed Cost of 100 ft. of Straight Pipe
2½"	388.02
3"	435.24
3½"	465.55
4"	503.68
5"	597.27
6"	680.37
8"	895.10
10"	1,191.35
12"	1,441.32
14"	1,644.73
16"	1,939.28
18"	2,131.99
20"	2,362.53
24"	2,778.27

Typical Installed Costs of 150-lb. Cast Carbon Steel Stainless Steel Trim Gate Valves

Size	Weld End Valve	Flanged Valve Using Slip-on Flanges on Pipe	Flanged Valve Using Welding Neck Flanges on Pipe
3"	166.26	178.92	181.72
3½"	193.79	210.55	214.51
4"	212.37	230.97	234.99
5"	287.59	313.44	319.26
6"	325.07	351.89	357.91
8"	441.04	474.80	487.26
10"	660.49	706.49	724.47
12"	823.59	902.05	918.45
14"	1,186.02	1,312.53	1,336.65
16"	1,585.50	1,753.53	1,763.97
18"	1,912.25	2,142.42	2,165.96
20"	2,409.53	2,705.17	2,737.79
24"	3,523.89	3,998.31	3,947.81

The figures for weld end valves include the cost of the valve, the labor for installing the valve, labor and materials for welding and a backing ring for each weld. The figures for the flanged valves include the cost of the valve, the labor for installing the valve, the labor for installing the flanges, the cost of the nuts, bolts and gaskets, the labor and materials for welding and, in the case of the weld neck flanges, the necessary backing rings. The valve manufacturers usually charge the same price for flanged or weld end valves, so the difference in installed costs results from the additional materials required for installing flanged valves and the labor for installing the additional materials.

The following table gives some typical prices for 6-in. valves of various types and materials and represents the cost of the valve alone without any of the labor or materials required to install it:

6"—125-lb. 3% nickel cast iron, stainless steel trim—	
Flanged Gate Valve	181.92
6"—125-lb. cast iron, bronze trim—	
Flanged Gate Valve	90.93
Screwed Gate Valve	84.45
Flanged Globe Valve	95.27
Screwed Globe Valve	86.20
Flanged Check Valve	57.86
Screwed Check Valve	51.03
6"—200-lb. semi-steel, flanged lubricated—	
Plug Valve	67.04
6"—150-lb. cast steel, stainless steel trim—	
Flanged Gate Valve	253.16
Weld End Gate Valve	253.16
Flanged Globe Valve	338.53
Weld End Globe Valve	338.53
Flanged Check Valve	242.26
Weld End Check Valve	242.23
6"—300-lb. cast steel, stainless steel trim—	
Flanged Gate Valve	396.11
Weld End Gate Valve	396.11
Flanged Globe Valve	418.94
Weld End Globe Valve	418.94
Flanged Check Valve	298.82
Welded End Check Valve	298.82
6"—600-lb. cast steel, stainless steel trim—	
Flanged Gate Valve	798.34
Weld End Gate Valve	798.34
Flanged Globe Valve	872.52
Weld End Globe Valve	872.52
Flanged Check Valve	586.20
Weld End Check Valve	586.20
6"—900-lb. cast steel, stainless steel trim—	
Weld End Gate Valve	1,229.82
6"—900-lb. cast 1¼% chrome, ½% moly cast steel —	
Weld End Gate Valve	1,285.72
6"—900-lb. cast steel, stainless steel trim—	
Weld End Check Valve	1,013.60
6"—200-lb. type 2, 20% nickel NI-resist—	
Flanged Lubricated Plus Valve	372.44
6"—900-lb. cast steel, stainless moly cast steel—	
Weld End Globe Valve	2,008.53
Weld End Check Valve	1,039.33
6"—3% nicked cast iron, stainless steel trim, Std. F to F—	
Flanged Pulp Stock Valve	178.40
6"—C. I. body, Saran-lined, Flanged Saunders Patent Valve—	
Teflon Diaphragm	204.46
Saran Rubber Diaphragm	160.47
KEL-F Diaphragm	221.70
Acid Resistant Rubber Diaphragm	160.47
6"—C. I. body, Horizontal Flanged Check Valve	307.23
6"—C. I. body, Vertical Flanged Check Valve	256.03
6"—C. I. body, rubber-lined, rubber diaphragm	
Flanged Saunders Patent Valve	246.36
6"—C. I. body, rubber-lined, Std. F to F	
Flanged Pulp Stock Valve	215.19
6"—200-lb. type 2, 20% nickel NI resist—	
Flanged Gate Valve	237.38
6"—125-lb., 3% nickel cast iron, Stainless steel trim—	
Flanged Check Valve	108.21
6"—150-lb. cast 304 or 316 stainless steel—	
Flanged Gate Valve	300.63
Flanged Globe Valve	393.42
Flanged Check Valve	370.22
6"—150-lb. cast 317 stainless steel—	
Flanged Gate Valve	385.93
Flanged Globe Valve	555.57
Flanged Check Valve	475.28
6"—300-lb. cast 304 or 316 stainless steel—	
Flanged Gate Valve	677.61
Flanged Globe Valve	1,414.67
Flanged Check Valve	1,265.76

A study of the above figures will indicate the relative costs of various valve types and materials of construction. The list is not complete, but it includes the majority of the valves normally used in pulp and paper mills.

Valves are available in a wide assortment of types, sizes, classes, materials, end connections, etc.

The type of manual valves most used in pulp and paper mills are gate, globe, pulp stock, plug, diaphragm, seatless plunger, "pinch" and metering. Other types are made but rarely used in pulp and paper mills in any significant quantity.

Gate valves

More gate valves are used in pulp and paper mills than all of the other types combined. This valve is particularly suited for tight shut-off service in a wide variety of applications.

Gate valves are made in cast iron, cast steel, forged steel, and in bronze, aluminum, ferric alloys, stainless steels, nickel alloys and other materials by casting and forging operations.

Gate valves are made with butt welding, socket welding, flanged and screwed end connections (also bell and spigot and mechanical joint for underground service) and may be of the rising steam or non-rising steam styles.

The gate or disc, as it is variously called, may be of solid or twopiece construction. If it is solid, it may be known as a solid wedge disc, or it may have a saw kerf around its circumference and be known as a solid split wedge disc. If it is of two-piece construction, it is known as a double-disc.

The disc faces are usually fitted with "disc rings" and the valve body with "seat rings" of a material with characteristics that will promote tight closing, ease of operation and long life for the valve. These rings along with the stem constitute the valve "trim."

Gate valves are available in most materials in sizes from ⅛ in. through 24 in. and for some materials in sizes 30 in. and 36 in. Very few valves larger than 24 in. are ever required in pulp and paper mills.

Cast iron valves are not made with socket welding or butt welding ends, but cast and forged carbon and ferric alloy steels are obtainable with both welding end types.

Cast iron valves are made in accordance with ASTM A-126. Cast carbon steel valves are made in accordance with ASTM A-216. Cast ferric alloy steel valves are made in accordance with ASTM A-217. Cast stainless steel valves are made in accordance with ASTM A-351. Cast bronze and brass valves are made in accordance with ASTM B-61 and B-62.

The flanges on cast iron valves are faced and drilled in accordance with ASA B16b2 for 25-lb. valves, ASA B16.1 for 125-lb. valves, ASA B16.2 for 250-lb. valves and ASA B16b1 for 800-lb. valves. The flanges on cast carbon steel or cast ferric alloy steel valves are faced and drilled in accordance with ASA B16.5 for 150-, 300-, 400-, 600-, 900-, 1500-, and 2500-lb. valves. The flanges on cast bronze or brass valves are faced and drilled in accordance with ASA B16.24 for 150-

and 300-lb. valves. Stainless steel valves may be obtained with flanges faced and drilled in accordance with MSS SP-42 or ASA B16.5.

Globe valves

Globe valves are primarily used for throttling of flow. Tight shut-off can be obtained with a globe valve, but since they are more expensive and are not designed to give as positive shut-off as the gate valve, they should not be used for purely shut-off service.

Although the gate valve can be used for throttling applications, its throttling characteristics are not as desirable as those of the globe valve.

Globe valves are not made in sizes above 12 in. or 14 in. in any material or pressure class, and many materials and pressure classes are not made in sizes larger than 6 in. or 8 in. The range of sizes made is adequate for almost every application since the forces acting on a globe valve disc are very great in the larger sizes when a pressure differential between the inlet and outlet of the valve is within the ranges usually encountered in operation and make the valve very difficult to manipulate.

Actually, very few applications ever occur in pulp and paper mills where a globe valve larger than about 4 in. is required.

Pulp stock valves

The pulp stock valve was developed specifically for pulp and paper mill use in pulp stock piping. This valve is made in a wide variety of styles, but all are very similar.

These valves are obtainable in cast and fabricated forms in cast iron, nickel cast iron, cast stainless steel, fabricated carbon steel and fabricated stainless steel. In addition to the above metals, pulp stock valves are obtainable with bodies of solid plastic and asbestos cement, plastic and rubber-lined fabricated carbon steel.

Both the cast and fabricated valves are obtainable in standard ASA face-to-face dimensions, "wafer" face-to-face dimensions that vary according to the manufacturer and "short" face-to-face dimensions that vary according to the manufacturer and are of a dimension somewhere between the ASA and "wafer" dimensions.

It is the author's opinion that the standard face-to-face valve should be used throughout the mill, with the "short" and "wafer" face to face valves used only where limited space makes the longer standard ASA face-to-face valve undesirable, or where some process consideration makes the non-standard valves desirable. The reason for this is that the ASA face-to-face valve is interchangeable regardless of manufacturer, while the other valves are not interchangeable.

Fabricated pulp stock valve manufacturers could perform a great service to the pulp and paper industry by cooperating with each other in establishing standards for both the "short" and "wafer" face-to-face dimensions.

Also, it is the author's opinion that the use of cast stainless steel valves is not usually warranted, since they are much more expensive than the fabricated stainless steel valves and do not give sufficiently longer life or more satisfactory service to correspond to the increase in cost. Also, the cast iron pulp stock valve is preferred over the stainless steel fabricated valve since they cost nearly the same, and the cast iron is more rugged. It is not felt that the fabricated carbon steel valve should generally be used since this material is the least corrosion resistant of any of the materials, and the savings in cost is not proportionately great.

Plug valves

Plug valves are made in lubricated and non-lubricated styles, ball plug, straight plug, tapered plug, eccentric plug and lift plug types.

These valves are used in pulp and paper mills in a variety of services ranging from air and gas to lime sludge. For the lubricated plug valves it is important that the lubricant used be compounded to give satisfactory results for the particular service. Also, the lubricated type of plug valve may not give satisfactory results in services where contamination by a small amount of lubricant could prove offensive.

Plug valves are obtainable in cast iron, ni-resist, stainless steels, carbon steel and bronze and in several pressure classes. Some plug valves have full size ports, while others have ports of restricted cross section of venturi or other shape.

Diaphragm valves

Yet another type of valve extensively used in pulp and paper mills is the Saunders Patent diaphragm valve. This valve is particularly useful in corrosive services where conventional metals are not satisfactory, since it is made in cast iron with a wide variety of linings such as soft rubber, hard rubber, Saran, Heresite, lead, Neoprene, polyethylene and porcelain enamel. In addition to the lined valves, valves of cast iron, galvanized cast iron, cast steel, aluminum, Durimet "20", Everdur (tin-lined or hot tin-dipped), Everdur, Hastelloy "B" or "C", Inconel, Monel, nickel, ni-resist types I and II, stainless steels, solid polyethylene, solid Karbate, solid porcelain and solid stoneware.

The above valve bodies may be fitted with diaphragms of several types of rubber and Neoprene in addition to Kel-F, Teflon, polyethylene, Tygon, Saran, rubber and other materials.

Diaphragm valves are available in sizes from ¼ in. through 18 in. for most lined and unlined metallic valves. All diaphragm valves are available with flanged ends, and some sizes and materials are available with screwed ends.

Diaphragm valves are not suited for extremely high operating pressures. These valves are normally limited to operating pressures of 150 psig in sizes 4 in. and smaller, 125 psig for sizes 5 in. and 6 in., 100 psig for the 8-in. size, 65 psig for the 10-in. and 12-in. sizes and 50 psig for sizes 14 in., 16 in. and 18 in. Operating pressures above these figures will result in difficult valve operation.

"Pinch" valves

"Pinch" valves are simply a section of hose with a clamping device in the center for pinching the hose walls together to modulate or shut off the flow. These valves give good service where the operating pressure and temperature are within the range allowable for the hose material.

"Pinch" valves are particularly suited for services involving suspended solids, since they offer no place for the suspended material to build up and plug the valve. Should the valve plug when shut or almost shut, it will usually unplug when wide open.

The section of hose is available with either flanged ends or plain ends. The plain end type is usually used in small sizes where the hose is slipped over the end of the pipe and banded in place.

The major disadvantage of "pinch" valves is the amount of space required for their installation.

Seatless plunger valves

The seatless plunger type of valve is extensively used in boiler blow-off service and other similar applications where the service is so severe that the seats of other types of valves are rapidly damaged. These valves are made in cast iron and cast steel up to 1500-lb. ratings.

Metering valves

Metering or flow control valves are made in a wide variety of styles in cast iron, bronze, steel and stainless steel. These valves are usually essentially globe valves with the disc and/or the seats characterized to give specific throttling characteristics. These valves are made in small sizes, usually with either screwed or flanged end connections.

Cost reduction — theme of 39th annual convention of the APPMSA

COST REDUCTION was the theme of the 39th annual convention of the American Pulp & Paper Mill Superintendents Association. The gathering was held at the Hotel Statler, Boston, Mass.

The complete program in addition included 18 technical papers presented at five technical sessions, three panel discussions, two guest addresses and two mill visits.

Elected president of the association for 1958-59 was Howard E. Wehr, division manager of the Harriman, Tenn. plant of Mead Corp. He succeeds Albert E. Bachmann, president of Missisquoi Corp. and Fonda Container Co. of St. Albans, Vt.

The newly-elected fifth vice president is Glen T. Renegar of Container Corp. of America's plant at Philadelphia.

Other officers include: A. C. McCorry of St. Regis Paper Co. (first vice president); Thomas S. Coldeway of St. Joe Paper Co. (second vice president); C. Ives Gehring of Sealright-Oswego Falls Corp. (third vice president), and Bemis P. Wood of Strathmore Paper Co. (fourth vice president).

In his president's message Bachmann announced that it had been proposed to change the name of the Superintendents Association to P.I.M.A., an abbreviation for Paper Industry Management Association. The change is desirable both in the interests of brevity and to avoid restriction of membership to people carrying the specific title of superintendent.

Cost reduction trends affect economy

In his keynote speech on cost reduction at the opening session, Robert E. O'Connor, executive secretary of the American Paper & Pulp Association, suggested that when considering cost reduction, management should concern itself not so much with a lower expenditure in dollars as with the amount of return obtained for the dollars spent. The next several years, he said, while demanding a more efficient operation by management, hardly merit any hastily-conceived and indiscriminate slashing in operating costs. The latter could only have a prolonged and harmful effect on some companies. What may be needed is a "dosage of dynamic economy" involving an exertion of all our management skills and techniques. This effort might even entail increased rather than reduced total costs.

O'Connor suggested that the profit approach for our industry should be the direction in which our thinking should be tending, and our concern with costs should be with a profit potential in view. One area to which O'Connor thought the industry could profitably devote more attention and more financial outlay is that of research and development.

Imperative need for cost reduction

H. M. Gray, vice president in charge of operations for Sealright-Oswego Falls Corp., emphasized the need for cost reduction in all types of American industry to avoid the results of a runaway inflation. We cannot have a strong nation, capable of successfully defending itself, he said, if we do not have the firmest of economies.

Costs must also be reduced so that we do not run the danger of pricing our production out of a favorable competitive position. He pointed to the inroads into the pulp and paper market that have been made by lightweight foils, films, plastics and even improved glass and heavier metals.

Cost reduction can be achieved by increasing the productivity per machine and per manhour by using our knowledge and by installing mechanical controls and using automation where practical.

He cautioned against the danger of over-maintaining equipment, which is characteristic of companies that are reasonably healthy, while companies in not as favorable financial conditions are inclined to undermaintain their equipment to the point that costs pyramid by too frequent breakdowns.

Foreman education for cost reduction

T. E. Hoover, production superintendent of Kimberly Clark Corp., suggested that high wages and high prices will be with us for some time to come, and that therefore closer control of costs is becoming more important in the successful operation of a business. To implement a cost reduction program a manufacturing concern must have a good cost control system, good communications, an organization team to attack the problem and foremen who understand their responsibilities for cost reduction. Even more basic, he said, are attitudes and feelings that crews must have toward productivity and cost reduction. Accordingly, the foremen at Kimberly-Clark are trained to be leaders, salesmen and promoters in three areas: safety, quality and housekeeping.

The foreman today, Hoover continued, needs a similar understanding of basic economics so that he can help create the right climate and atmosphere for productivity gains and cost reduction programs. The foremen's training must be done continuously. For instance, appropriate films can be shown three or four times a year, articles and pamphlets dealing with economics can be circulated, the foremen can be provided with a flannel board presentation that they may present to their crews, they should be sent to conferences when possible, with the result that the foremen will unconsciously be able to promote productivity and cost reduction in their everyday contacts with their crews.

A well-planned sales program as an aid to cost reduction

R. Carl Chandler, Standard Packaging Corp., discussed the need of a well-planned sales program at the luncheon honoring the division chairmen.

Taking recourse to hasty "austerity" programs either misses the most productive opportunities of a business or actually damages the organization's future potential, he said. No sales program has ever been developed overnight. Statistics show that 80 per cent of all sales are made after the fifth call.

He further discussed a number of steps sales must take in attaining sales objectives and concluded that

Seen by our camera at the conference

Martin J. Roach of Great Northern Paper Co. and W. L. Tiller of St. Regis Paper Co.

John Wilson of Hinde & Dauch Paper Co. of Canada Ltd. and W. A. Giese of Container Corp. of America.

A. C. McCorry of St. Regis (first vice president of the association) and Ron Goodwin of Black-Clawson Co.

Bill Hickey of Clark & Vicario; Ralph M. Buechler, D. J. Murray Mfg. Co., and Bob Kaiser of North Tarrytown, N. Y.

Frank Calkin of Tennessee Corp. and Arthur A. Coffin of Titanium Pigment Corp.

Paul Nash of Nash & Harrison Ltd.; E. C. Gilbert, Rolland Paper Co. Ltd., and A. St. Jacques, also of Rolland Paper.

if every company represented at this meeting were to plan a program to assure a minimum of 10-per cent improvement in sales this year, 3,000,000 tons of additional business would be the result to help absorb our present over-production capacity. With the same imagination, ingenuity, effort and determination applied for the balance of 1958 and in the immediate years ahead, all the forecasts of too much capacity stressed by our economists will be disproved. While in reality our industry does not have too much productive capacity, it is suffering from a lack of sales planning and determined sales effort as related to existing capacity.

J. W. D. Hierlihy of Fraser Paper Ltd.; Bemis P. Wood, Strathmore Paper Co. (fourth vice president of the APPMSA), and Jack B. Toobert of Detectron.

Lester Crouse of Penick & Ford Ltd. Inc.; Larry Mitchell of John W. Bolton & Sons Inc., and E. M. Wagenknecht, A. P. Wagenknecht Co.

Claude H. Smith of Esleeck Mfg. Co.; Russell W. Hamilton, St. Regis; Bill Elkins, Rodney Hunt Machine Co., and P. L. Frederickson, St. Regis.

G. T. Edmond of Chesapeake Corp. of Virginia; Sam Widmer of Torrington Co.; J. R. Conboy, also of Torrington, and R. E. Bowyer of Chesapeake.

In the course of this discussion Chandler provided some interesting figures showing that 68 per cent of a firm's customers drift away because of the firm's indifference towards them; 80 per cent of the firm's sales are made after the fifth call, and that these 80 per cent of all sales are made by the 10 per cent of the salesmen who keep on calling.

Cost reduction through safety

Ralph V. Metz, training and safety director of the Bleached Board Div. of West Virginia Pulp & Paper Co., drew attention to the magnitude of the indirect costs of accidental injuries, which have been estimated through careful studies to be as high as four times the direct costs. These indirect costs include damage to the equipment or product, interruption of production, loss of time, the lowering of morale, etc.

In practice, Metz said, accident control takes its proper place along with production control or quality control as an integral part of the line supervisor's responsibilities. To be successful in our efforts to reduce costs through an effective safety program, we need to have a program that is logical, specific and practical. The supervisor in charge of the work being done is in the best position to recognize and eliminate the causes of accidents. He has the opportunity, authority and responsibility.

Since the frequency of disabling injuries varies directly with the frequency of minor injuries and with the frequency of no-injury accidents, it becomes necessary to study and control the no-injury accidents as well as those accidents that result in personal injury.

Non-financial incentives of productivity

Alva F. Kindall, professor of business administration at Harvard University, said that non-financial incentives could result in greater productivity and more cost reduction than most of the financial incentives. The non-financial incentives of productivity, which are the results of good personnel administration, are associated with management that has high standards of character and morality, written and published policies or a Bill of Rights, high standards of administration and good leadership, good organization concepts, a competent personnel administrator at the top organization level and a desire for participation by consultation and explanation.

The management team must also provide a work environment that appeals to the pride and self-respect and dignity of the individual, be sympathetic and considerate of people's trials and tribulations, provide steady and certainty of employment, provide promotional opportunity and an adequate training program, etc.

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Rigidly supported, stationary, dual concentric screen plates in combination with scientifically designed hydrofoils produce smooth, continuous, maximum flow of clean, shive-free stock. Ask for detailed information on performance tests covering months of mill operation.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASS.

REGIONAL OFFICES: EVANSTON, ILLINOIS
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Canadian Manufacturers of Bird Machinery
CANADIAN INGERSOLL-RAND COMPANY, Limited, Montreal

CURRENT COMMENTS

Renewed confidence . . . capital conservation . . . and inconsistency

by WARREN B. BULLOCK

The confidence of the investing public in a paper industry comeback from the 1957 recession is shown by significant changes in the market prices for paper mill securities. The common stocks of 17 paper companies quoted on the New York Exchange — excluding Great Northern, which is a story in itself — rose in the early months of 1958 from an average of 32½ to an average of 39, an increase in market value of $7.50 per share, or 23.8 per cent. International Paper with a spread of more than 14 points showed the largest advance.

United States News and World Report in a survey of the investment field gives the increase in paper mill securities as 23.2 per cent over the low figure in 1957 and the increase in the paper container field as 21.2 per cent. One Wall Street commentator points to an increase of more than 3 points in a week in the market price of Rayonier as evidence that the chemical and cellulose business is in for a bulge.

Public interest in paper mill investment is shown by the fact that various paper mill securities not listed on the New York exchanges are currently quoted in the over-the-counter field. Some such are P. H. Glatfelter, for which the recent bid and asked prices were respectively 52 and 57; Hudson Pulp & Paper, 24¼ and 26¼; S. D. Warren, 34½ and 37¼, and Bowater Paper 4¼ and 4¾.

Dividend reductions

Some companies are conserving their capital, however, after the long period of falling markets. Hammermill reduced its dividend from 37½ cents per share to 25 cents per share for the current quarter, the drop being ascribed to loss in income from the reduced dividend paid by Rayonier on Hammermill's holdings of 356,000 shares in that company. Smaller dividend reductions have been voted for the current quarter by Hamilton Paper, River Raisin Paper and Sorg Paper.

All forecasts by industry leaders are optimistic for the future. Thomas B. McCabe, president of Scott Paper, in an address before the American Management Association meeting at which President Eisenhower was also a speaker, said: "I believe that we are already headed in the right direction to overcome our economy's current set back."

In the case of Great Northern, which suffered a steep drop in its stock quotations, a Wall Street house has issued an elaborate survey recommending purchase of this stock that is quoted at only a third of its actual book value—if its 2,000,000 acres of timber holdings are included. The survey pointed out that Great Northern's $75,000,000 expansion program will be an important feature of its future, a program already nearing completion. Less than half of the company's stock is in the hands of individual investors. This company, which has a third of the nation's newsprint capacity, is due for better things when the present newsprint stringency is overcome — in the judgment of the Wall Street concern. The day after this analysis was published the price of Great Northern stock rose $3 a share on the New York Stock Exchange.

Government inconsistency

The inconsistency in government attitudes toward foreign trade is again evidenced in a report by the Department of Justice on what it believes—but cannot prove—is collusion in the stifling of competition in the newsprint field. While Congress has passed legislation to encourage domestic industries to unite for a joint increase in their exports to foreign markets, the Department of Justice complains that it cannot prove price-fixing in the market for newsprint because three quarters of the market is supplied by Canada.

Attorney General Rogers in a semi-annual report to the President stated that the newsprint industry is superbly self-informed with interchanges of statistics on supply, demand and mill performance; but that while the industry vigorously denies collusion in fixing prices, it with equal vigor denies access to records that might dispel the doubt.

Financial Reports

An unseasonal lag in the paperboard field was reflected in the failure of paperboard securities on the nation's stock markets to maintain the upward trend shown in the paper field.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	June 10, 1958	May 9, 1958
American Can	58⅜	46⅞
Celotex	27	29⅛
Same Pref.	19½	* 19⅛-19¼
Certain-Teed Products	9⅝	9⅞
Champion P&F	39½	39
Same Pref.	97½	* 95½-102
Chesapeake Corp.	28¼	27
Container Corp.	21¼	20⅛
Same Pref.	* 92-95	96
Continental Can	51⅜	47⅝
Crown Zellerbach	49⅝	46¼
Same Pref.	98	100
Diamond Gardner	30⅝	32½
Same Pref.	32½	....
Eastern Corp.	32	29¾
Federal Paper Board	36¾	35
Same Pref.	20⅞	20⅛
Fibre Paperboard	27¼	27¼
Same Pref.	* 99¼-101	* 96-98
Great Northern	44⅜	37⅞
Hammermill	23⅞	23⅝
International	98	96⅜
Same Pref.	95¼	* 94-94½
Kimberly-Clark	57⅜	55½
MacAndrews & Forbes	* 25¼-26½	26½
Masonite	29⅝	28¾
Mead Corp.	35¼	35
Same Pref.	94½	95
Minnesota & Ontario	26⅜	25⅞
Oxford Paper	33¾	33½
Same Pref.	* 96-97½	* 95½-97
Rayonier	17½	15¾
Riegel	* 26¾-27	24⅝
St. Regis	33¼	33½
Same Pref.	* 95-96½	* 93½-95
Sealright	33⅝	30½
Sutherland	34⅛	34½
Union Bag-Camp	33⅛	34¼
United B. & C.	23¼	25
United Wallpaper	7	7⅜
Same Pref.	* 14-15½	* 14-15¾
U. S. Gypsum	77	76⅛
Same Pref.	169	165¾
West Virginia P. & P.	37⅝	35⅜
Same Pref.	*101½-103	101½

New York Stock Exchange — Bonds

A.P.W. Products 5%	—	—
Champion P & F 3¾%	—	—
Champion P & F 3%	—	—
Kimberly-Clark 3¾%	101⅛	—
Mead	—	—
Scott Paper 3%	104¼	103⅞

American Stock Exchange — Stocks

Allied Paper	8¼	8⅛
American Writing	18¾	18
Brown Company	12¼	11¼
Puget Sound	15⅜	15⅛

*Closing Bid and Asked Prices.

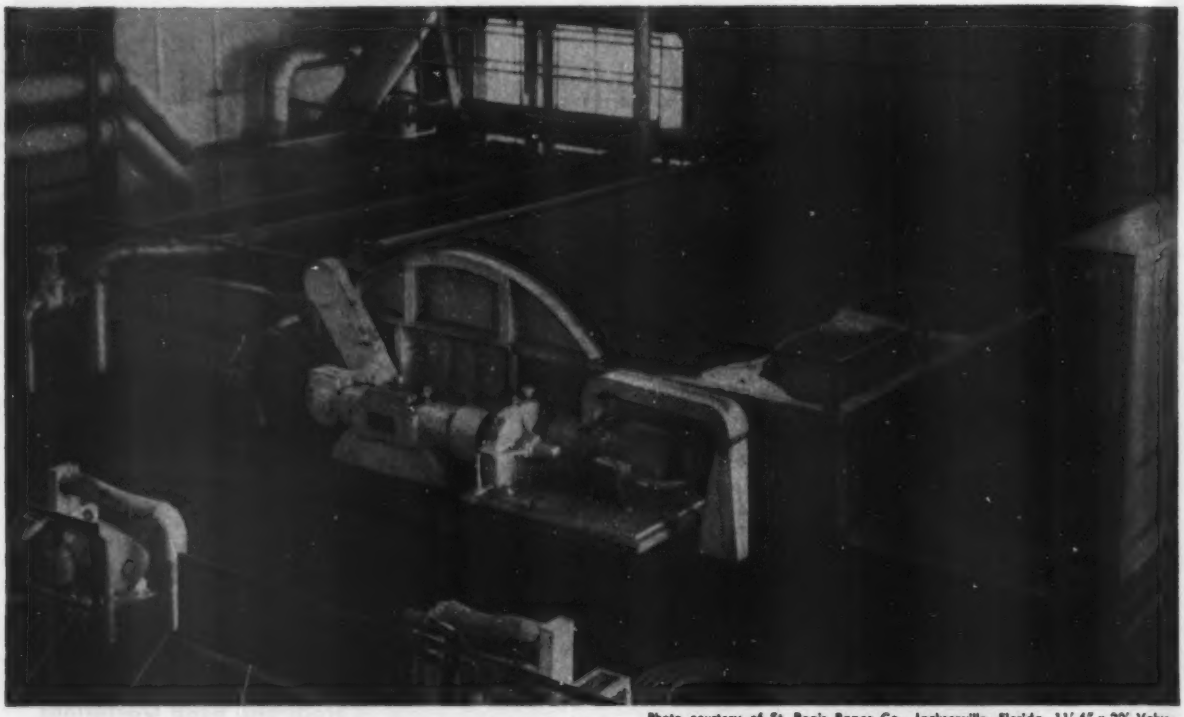

Photo courtesy of St. Regis Paper Co., Jacksonville, Florida. 11'-6" x 20' Valveless Decker Saveall operating with new "Seminole Chief" Kraft Board Machine.

IMPCO VALVELESS DECKER-SAVEALLS

There are more than 235 Impco Valveless installations. Many of these fall in the Decker-Saveall category. Several handle the entire paper machine production, using white water as dilution. Some act as broke thickeners, again using white water as dilution. Others are in a variety of saveall applications. In all cases the Impco Valveless delivers clarified effluent suitable for re-use, with pulp discharged at a controllable consistency for proper stock preparation. May we show you how this versatile machine can reduce your costs and simplify your operating procedure?

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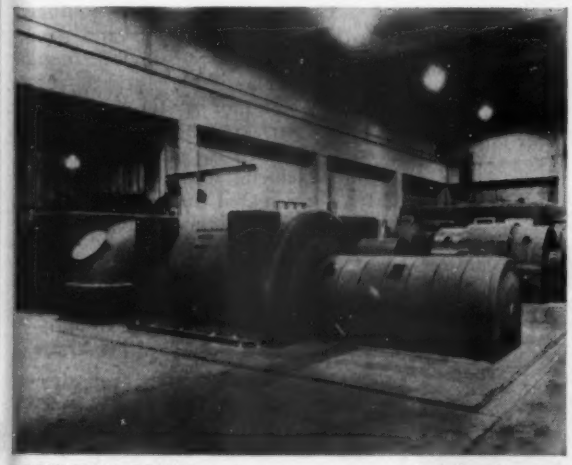
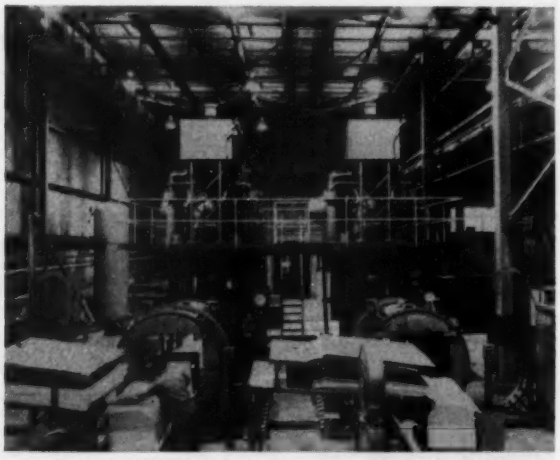
NASHUA, NEW HAMPSHIRE

In Canada, Sherbrooke Machineries Limited, Sherbrooke, Quebec

NEWS of the INDUSTRY





ADDITIONAL POWER and process steam required for the modernized Port Alice plant are provided by this 7500-kva CGE double-extraction turbo-generator (left). At the right is a view of the roll-over machines and 1000-ton baling presses in the finishing room. The over-all expansion at Alaska Pine & Cellulose cost about $14,000,000.

Alaska Pine & Cellulose Completes Major Project

Alaska Pine & Cellulose Ltd. has completed a $14,000,000 expansion and modernization program at its Port Alice, B. C. chemical cellulose mill. The plant is now "one of the finest mills of its kind in the world".

The total expansion and modernization expenditure of $14,000,000 has been invested since 1954, when Rayonier Inc. acquired control of the British Columbia firm. And, according to a spokesman for the company, "the highest grades of chemical cellulose can now be manufactured".

The expansion and modernization program, has resulted in changes that will increase the Port Alice productive capacity from 75,000 annual tons to an ultimate 125,000 tons.

The project included the installation of a new pulp-drying machine, a finishing room with cutter, a layboy and high-pressure baling presses. Two digesters have been added, as well as a large new boiler and a 6000-kw turbo-generator.

Changes have been made in the bleach plant to improve quality, and new equipment has been added to the screen room to handle the increased production. A car barge slip has also been constructed to facilitate the bringing in of necessary chemicals.

(The original Port Alice mill came into operation in 1918. *In* 1959 *the Abitibi and Koerner interests purchased British Columbia Pulp & Paper Co. Ltd.—of which Port Alice was a part. Alaska Pine & Cellulose was then formed. Its control was acquired late in* 1954 *by Rayonier Inc.)*

Madison Lab Recognized for Work in Hardwoods

Research that has helped to bring the long-ignored hardwoods into use for the manufacture of paper has won recognition for the Pulp & Paper Div. of the United States Forest Products Laboratory in Madison, Wis.

The Distinguished Service Award was announced by the U. S. Department of Agriculture in recent ceremonies at Washington, D. C. It is the highest honor offered by the USDA. No other Forest Service unit has ever been so recognized.

The commendation received by the laboratory reads, "For execution of research and the development of processes resulting in greatly expanded and more efficient use of hardwoods for pulp and paper".

The award was based primarily on the laboratory's development of the semichemical and cold soda pulping processes. As a result of this work, "aspen and other species of wood once considered as 'forest weeds' have been widely used by mills in the East and in the Lake States and have been finding increasing use in the South and West".

The Pulp & Paper Div. at the laboratory is now headed by Gardner H. Chidester. Laboratory director is Dr. J. A. Hall.

Work on the semichemical process was begun at Madison in the 1920s, and the first commercial application for pulping hardwoods was launched in 1924. Some 35 mills in the United States now use the method.

A significant adaptation of the semichemical principle was the cold soda process, which had its first full-scale commercial trials in 1950. It is utilized by at least six U. S. mills, three in Europe and two in Australia.

New Chemical Recovery Unit in Operation at Chesapeake Corp.

Chesapeake Corp. of Virginia has put into operation its third and largest chemical recovery unit at West Point, Va. The 500-ton boiler is "designed for one of the highest pressure and temperature-level com-

binations yet engineered in this country".

Installation and operation of the unit completes a cycle of expansion and modernization of the kraft pulp and paper plant at West Point. Since the end of World War II the expenditure has amounted to approximately $21,600,000.

The large boiler was built by Combustion Engineering Inc. and was erected by Tidewater Construction Co. of Norfolk, Va.

The furnace of the boiler burns the black liquor produced by cooking pulpwood. The liquor is reduced to smelt, from which the chemicals used in the cooking process are recovered for reuse. Generated steam is used in the production of electric power.

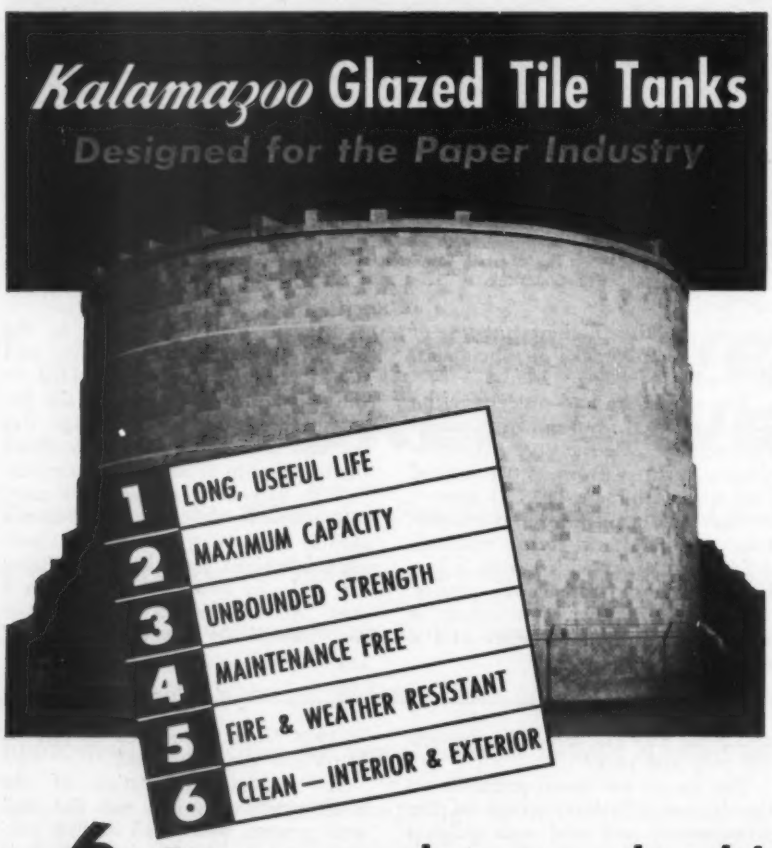
A three-compartment electrostatic precipitator recovers chemical dust from the furnace gases. It was supplied by Research-Cottrell Inc. and is designed for 210,000 cfm gas and 95-per cent recovery of chemical solids.

According to a spokesman for the firm, "The boiler is built for 1200-lb. pressure and 900°F. . . . The entire furnace envelope and decanting floor is constructed of 2-in. tangent tubes utilizing a double-skin steel insulated casing. . . . and the entire bottom, front, rear and side walls are hermetically seal-welded to one another to prevent any possibility of smelt leaks in the lower furnace area .

"The lower furnace is equipped with four standard oil and steam atomizing guns for bringing the unit on line. The upper furnace above the black liquor sprays is equipped with four tangential oil burners, each of which is capable of producing 40,000 lb. steam per hour. . . . It is anticipated that complete automatic combustion control may be obtained in the near future."

Kalamazoo Glazed Tile Tanks

Designed for the Paper Industry



6 Reasons why you should give us a call on your next job

Kalamazoo's steel reinforced glazed tile tanks are designed and erected by experts. If you have a specialized building problem it will pay you early dividends to call us now.

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Kalamazoo TANK & SILO CO. KALAMAZOO MICHIGAN

News of the Industry . . .

Expansion at Union Bag-Camp takes Forward Step

The first piles have been driven for the building that will house the new seventh paper machine at the mill of Union Bag-Camp Paper Corp. in Savannah, Ga.

The machine is scheduled to go into production in January 1960 and will represent "one of the most modern and efficient pieces of papermaking equipment in the entire industry".

The Beloit Iron Works unit will have a maximum production rate of 400 tons of paper per day. Designed to operate at 3000 fpm, it will measure 425 ft. in over-all length.

Features of the machine will include: an air-loaded headbox; a 62-ft. fourdrinier section; three suction presses; a combination breaking stack and striping press; a size press; five dryer sections totaling 60 dryers (each 60-in. diameter × 232-in. face); an eight-roll calender stack; a reel and winder, and a differential sectional drive using a 3000-hp steam turbine as a prime mover.

Auxiliary equipment will consist of 13 stock refiners (each with a 450-hp motor); eight vacuum pumps (driven by two 1350-hp motors); an 8- × 16-ft. saveall; a continuous brokebeater; a totally-enclosed machine hood and balanced ventilating system; four cranes (two of 30-ton capacity, one 25-ton and one 40-ton); 30 stock and water pumps (the largest being of 40,000-gpm capacity); a finished paper roll conveyor system, and three stock chests having a 60-ton total storage capacity—complete with agitators.

General contractor for the expansion project is Morton C. Tuttle Co.

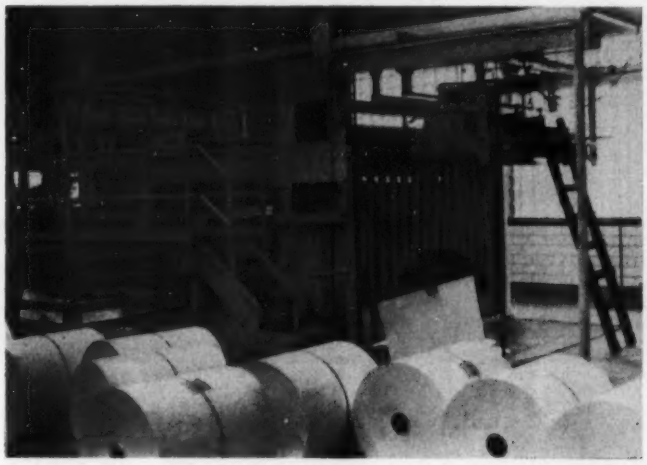
Working from rolls of board, this MAMCO Unit can produce accurate, rectangular sheets and stack high, evenly-jogged piles without stopping the Unit to remove filled skids.

This MAMCO Unit can be equipped to tag piles automatically into any predetermined sales-counts required by equipping it with the new Model of MAMCO Counter and Marker.

This equipment is heavy steel weldment construction, engineered for speeds of over 600 feet per minute (24 hour sustained duty) to hold loads up 30,000 lbs.

Available in all widths, for single or duplex duty.

May we quote you?



101" wide MAMCO Continuous-Running Piler in the new Mill of AMERICAN BOX BOARD COMPANY, Filer City, Michigan

MAXSON AUTOMATIC MACHINERY COMPANY

98 Granite Street,

Westerly, Rhode Island, U.S.A.

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Alberta West to Begin Construction this Summer

Alberta West Forest Products Corp. reports that construction is scheduled to begin this summer on its newsprint mill in Alberta.

Estimated to cost $15,000,000, the plant is to be located on the North Saskatchewan River between Edmonton and Ft. Saskatchewan.

Under an agreement with the provincial government, the firm has been granted a 21-year lease on 2483 sq. mi. of timber in the White Court area (about 100 mi. northwest of Edmonton). In addition, a 2500-sq. mi. timber tract is to be set aside as a reserve for future expansion.

St. Regis Expands Rhode Island Division

Almost a quarter of a million dollars is being spent by St. Regis Paper Co. in the expansion of its Engineering & Machine Div. facilities at East Providence, R. I.

Providing additional space for an engineering development laboratory and shop and manufacturing areas is a 21,000-sq. ft. structure at East Providence. The cost of building and improvements is expected to total about $300,000. E. Turgeon Construction Co. of Providence has been awarded the contract.

In conjunction with the building addition is a major program of machine tool replacement that has been underway several months. A major portion has been completed at a cost approximately $400,000.

The East Providence plant is St. Regis' engineering and machine development headquarters for the packaging and converting plants. It is also the center of machinery manufacturing facilities. The Engineering & Machine Div. was originally located in Chicago and was transferred to Oswego, N. Y., in 1929. It was moved to East Providence in 1953.

Recent Expansions in the Industry

Minnesota & Ontario Paper Co.

has installed at International Falls, Minn., a specialized 8-ft. diameter 13-ft. face roll for forming Insulite building board. The rolled and machined cylinder—supplied by Allis-Chalmers Mfg. Co.—has a total of 106,500 holes 11/32 in. in diameter and a 20-in. diameter shaft of centrifugally-cast alloy steel tubing with 3½-in. walls designed to reduce weight.

Albemarle Paper Mfg. Co.

will install a paper machine at its Roanoke Rapids, N. C. mill to handle the production of four existing units. The project will cost about $6,500,000 and will add 55 tons to daily capacity.

Georgia Pacific Corp.

has requested that the federal government grant a five-year extension for submission of plans for the construction of an Alaskan pulp and paper mill. The firm received a preliminary grant in 1955 for the cutting of 7½ billion bd. ft. of timber over a 50-year period. The grant was conditional on submission of plans for a mill by June 30, 1958. In announcing its request for an extension, the company noted that demand for newsprint had "quieted down" since 1955, when it exceeded productive capacity.

Fraser Companies Ltd.

of Edmundston, N. B., has acquired as a going concern all the assets of

Restigouche Co. Ltd. of Campbellton, N. B., and has assumed all its liabilities. (Restigouche Co. was formerly operated as a wholly owned Fraser subsidiary, but owing to its separate corporate identity a great deal of duplication was required.) The New Brunswick company will now be identified as the Restigouche Div. of Fraser.

Bestwall Gypsum Co.,
with general offices in Ardmore, Pa., is constructing a building materials plant in Brunswick, Ga. The multimillon-dollar facility will have an annual capacity of 300,000,000 sq. ft. of gypsum board and lath products. Operation is scheduled for late in 1959.

Crown Zellerbach Corp.
will substantially increase its production of polyethylene film through construction of a plant at Orange, Texas. The project is part of a long-term arrangement that has been concluded between CZ and Spencer Chemical Co., a manufacturer of polyethylene resins and other petrochemicals. The new facility is to be adjacent to the existing Spencer plant, and resin will be conveyed directly to the CZ operation for extrusion into clear polyethylene film for packaging. The film may be used on high-speed bread-wrapping machines through the use of a special attachment devised by Crown Zellerbach engineers. These attachments will be manufactured for CZ by American Machine & Foundry Co.

Orchard Paper Co.
has purchased a 100,000-sq. ft. tract adjacent to its St. Louis plant. Part of the acreage is being used for parking facilities, while the balance is earmarked for expansion of manufacturing and warehousing area. Also involved in the transaction was an 8000-sq. ft. building that will be used for warehousing, advertising and purchasing offices and the sample department.

Ellis E. Patterson & Associates,
Studio City, Cal. firm that obtained an option on northwestern Saskatchewan timberlands in 1956, has

News of the Industry . . .

maintained its interest in the construction of a kraft pulp mill in the province. However, A. G. Kuziak, provincial minister of natural resources, has reported that the firm "is having difficulty in arranging the financing" and only recently was granted a 60-day extension on its option.

Orchard Paper Co.'s
Racquette River Paper Corp. Div. is expanding manufacturing facilities at Potsdam, N. Y. New bag- and envelope-producing equipment for the converting plant will enable the firm to manufacture various paper specialty items. Also on order is a high-speed rotary printing press.

Northern Industries Ltd.
is a newly-formed Saskatchewan firm that plans the construction of a $1,100,000 blockboard plant. Work

STOP TELESCOPING ROLLS • MUSHROOMING CORES

Use HORTON Clutches and Brakes to control the sheet tension on your center winders and back stands. Take the guess work out of tensioning and let Horton equipment give you uniform good rolls all the time.

VARIABLE SPEED CLUTCH PULLEYS
GOVERNOR CONTROLLED BRAKES

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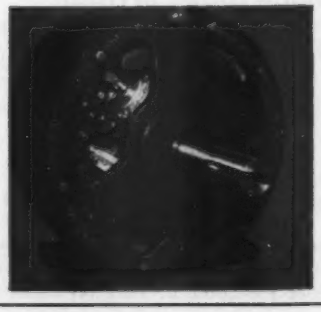
MINNEAPOLIS 14, MINNESOTA



Let this *new* bulletin help you select the right paper clay

You will want this easy-reading brochure as a handy reference to your choice of the exact grade of clay for your process.

Tables indicate in detail the most complete selection of coating and filler clays produced for the paper industry.

We will be glad to send you a copy of Bulletin TSB-PC-10 on request.

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COATING*	FILLER**
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*Available in Spray Dried, Pulverized or Lump form.
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GEORGIA KAOLIN COMPANY

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News of the Industry . . .

was scheduled to begin early in July, with operation expected in the spring of 1959. Initial annual production will total about 5,000,000 sq. ft. The project calls for a complete logging operation in a 493-sq. mi. area leased from the provincial government, a veneer and plywood mill, a core mill and related departments. Waste from the various operations is to be reclaimed for the manufacture of particle board. One of the first moves made by Northern Industries after its incorporation was the purchase of Northwest Manitoba Plywoods Ltd. at Birch River.

Allied News Notes . . .

Huyck Felt Co., with headquarters at Rensselaer, N. Y., has installed a large double endless fulling machine at its Aliceville, Ala. plant.

Two instruments invented by John D. Conti of the Film Div of **American Viscose Corp.** for the testing of packaging films have been licensed to F. F. Slocomb Corp. of Wilmington, Del., for exclusive manufacture. The units involved are the Avisco pliability tester and the Avisco flex tester.

Manchester Machine Co. of Middletown, Ohio, will construct a $1,500,000 plant near Monroe as its headquarters. Completion of the 100,000-sq. ft. facility is expected early in 1959, more than doubling the present productive capacity. The firm will continue to operate at the Middletown location until the new plant is ready; equipment will include $125,000 in new machine tools.

Multiple Corp. of Dayton, Ohio, has transferred the manufacture and sales of its Multi-Pul unit to Indus Corp. of Indianapolis.

Carpenter Steel Co. of Reading, Pa., has opened a corrosion research laboratory. The new facility "introduces important new means of accurately determining the corrosion rate on metals used for pulp and paper process equipment". Its findings, according to Carpenter, "will be vitally significant to the selection of materials for design and construction of such assemblies as sulfite liquor coolers, chlorine dioxide heaters, pulp digesters and all types of tubular heat exchangers".

Coming Events

Tappi

July 28-August 1—13th Engineering Conference, Multnomah Hotel, Portland, Ore.

September 10-12—Third Mechanical Pulping Conference, Chateau Frontenac Hotel, Quebec, P. Q.

September 15-17—Fundamental Research Conference, Queen Elizabeth Hotel, Montreal

September 24-26—12th Alkaline Pulping Conference, Arlington Hotel, Hot Springs, Ark.

September 30-October 2—Ninth Testing Conference, General Oglethorpe Hotel, Savannah, Ga.

October 20-22—13th Plastic-Paper Conference, Sheraton-Kimball Hotel, Springfield, Mass.

Superintendents Association

September 4-6—New York-Canadian Division, Lake Placid Club, Essex County, N.Y.

September 12-13—Northwestern Division, Conway Hotel, Appleton, Wis.

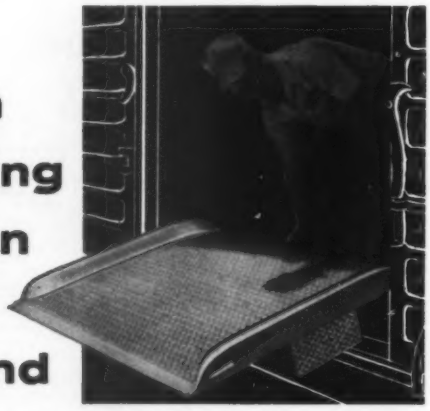
September 18-20—Northeastern Division, Poland Spring House, Poland Spring, Maine

Other meetings

August 18-20—Second Annual Heat Transfer Conference, Edgewater Beach Hotel, Chicago, Ill.

September 28-October 2—Electrochemical Society Inc., Chateau Laurier, Ottawa, Ont.

man putting down a sound investment!



This company has made a wise investment—one which will pay many dividends over a long period of time! The man above is dropping a Magliner magnesium dock board in place on the company's dock. This new Magliner will speed loading . . . get more out of power trucks and other loading equipment . . . keep costs down! Made of light, strong magnesium, it will protect men, loads and equipment against accidents and costly damage. It will also pay other big dividends! Magliners are low in initial cost—and because they provide dependable, long-life service with less maintenance they give you greater economy *ALL* ways! Find out today, how Magliner dock boards can cut costs in your operation. Write for Bulletin DB-204!

MagLiner MAGNESIUM DOCK BOARDS

MAGLINE INC. • P.O. BOX 137 • PINCONNING, MICHIGAN

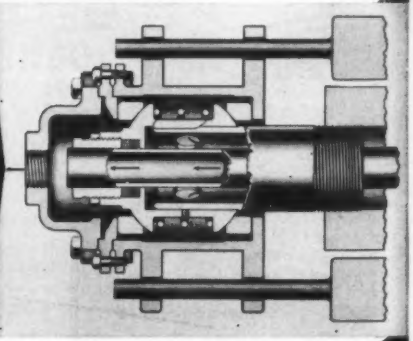
Canadian Factory: Magline of Canada, Ltd., Renfrew, Ontario

For High Speed Paper Machines with Revolving Syphon Pipes

In the Type LN Johnson Joints the revolving syphon pipe is made a part of the rotating assembly, yet is permitted longitudinal movement. Sealing is still accomplished without packing. Simple support rods carry all the weight of joint and connections, permit the rotating assembly to "float" freely inside. Special hangers and brackets adapt the mounting for machines with either open or enclosed gearing.

Johnson Joints fit all needs on paper machines, calenders, corrugators, waxers, embossers, roofing machines, printing presses. For full data on Type LN write for Bulletin N-2002.

Type LN Johnson ROTARY PRESSURE Joints "First in the paper industry"



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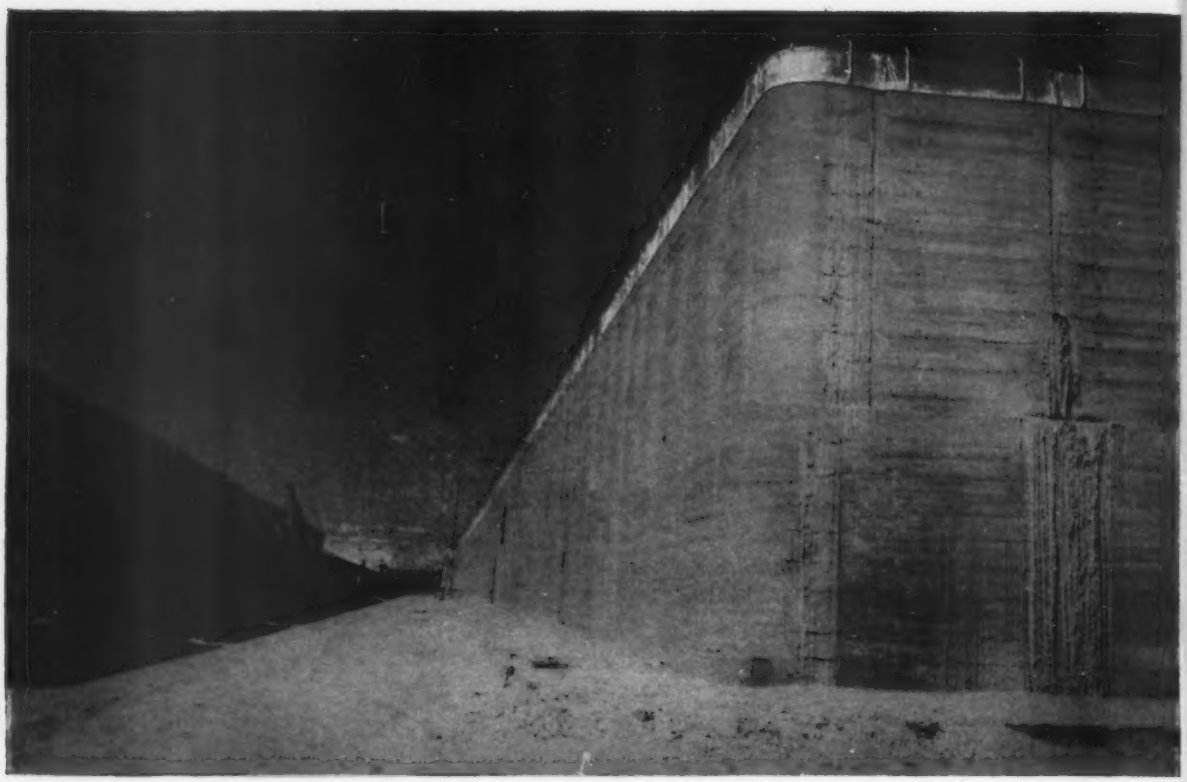

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NAMES in the NEWS

C. L. Crain

G. T. Ward

Crain and Ward Named to New International Posts

Carlie L. Crain and George T. Ward have been elected vice presidents of International Paper Co. Both men have been associated with the Southern Kraft Div. and will continue to headquarter in Mobile, Ala.

Crain, division production manager, began his career in the paper industry in 1916. He became associated with International Paper in 1925, when that firm purchased Bastrop Pulp & Paper Co. In 1941 he became coordinator of pulp mills for the Southern Kraft Div. and in 1951 was named assistant production manager. He has been production manager since 1952.

Ward has served as chief division engineer since 1945. He joined International as an engineer in 1930, was named assistant division engineer in 1944 and chief engineer in 1945.

J. W. Wing has been elected vice president and general manager of Dryden Paper Co. Ltd. He has been general manager and a director since May 1, 1957.

LEADERS OF THE Pulp & Paper Industry Subcommittee have an informal chat during the recent conference of the General Industry Applications Committee of the American Institute of Electrical Engineers. The meeting was held at North Carolina State College in Raleigh. Shown here are (l to r): Grant I. Burner of Rust Engineering Co., subcommittee chairman; Claude H. Hudson of General Electric Co., subcommittee vice chairman and program arrangements chairman, and Prof. W. D. Stevenson Jr. of the School of Electrical Engineering at North Carolina State.

Allied Personalities . . .

C. L. Bachelder, veteran sales representative for the Paper Makers Chemical Department of Hercules Powder Co., retired June 30 after 34 years of service. He made his home at Kalamazoo, Mich., and was at one time a chemist for Consolidated Water Power & Paper Co.

Fred C. Hassman Jr., Memphis branch office manager for a number of years, has been named to the newly created position of assistant southern division manager for Corn Products Sales Co. Succeeding him at Memphis is **Clifford M. Jennewein,** formerly district sales manager at Grand Rapids, Mich.

Allan Hyer, formerly one of the top executives with the Paper Machinery Div. of Black-Clawson Co. in Watertown, N. Y., has joined Pusey & Jones Corp. as vice president. He has been active in the paper machinery industry since 1918.

Carl Magnus, a paper mill consultant of Johnson, Vt., and formerly vice president and general manager of J & J Rogers Co. of AuSable Forks, N. Y., is in Korea to supervise the construction of two mills in the Seoul area. The work is being done under the auspices of the United Nations Korean Reconstruction Agency. Magnus is a past president of the Superintendents Association.

Necrology . . .

Paul B. Wyant

Paul B. Wyant, 53, treasurer of Scott Paper Co., died unexpectedly early in June at his Broomall, Pa. home. He joined the Scott organization as treasurer in 1954.

As a graduate of the Wharton Business School of the University of Pennsylvania, Wyant joined the staff of Chase National Bank & Chase Securities as a securities analyst and salesman. From 1931 to 1937 he was associated with Paine, Webber & Co. of Philadelphia, later being employed by Reynolds & Co. In 1952 he formed Paul B. Wyant & Co., offering financial advice to various individuals, organizations and institutions.

Herbert B. Newton

Herbert Boyden Newton, 84, president of Newton Paper Co. of Holyoke, Mass., died at his home June 10.

Following study at the Massachusetts Institute of Technology, he joined the staff of Newton Paper, of which his father was one of the founders. He became president on the death of his brother-in-law more than 20 years ago.

LeRoy J. Bauer, eastern district manager for Bauer Bros. Co. of Springfield, Ohio, died May 25 in the crash of a chartered airplane near Concord, N. H. He joined the firm in 1955 as a sales representative and had formerly been employed by Technifax Corp. and Doeskin Products. Bauer was a graduate of the University of Massachusetts.

Eugene Warren, 85, who retired 10 years ago as treasurer of John A. Manning Paper Co., died June 3 in Troy, N. Y.

Carl Riordon, founder and first president of the Canadian Pulp & Paper Association, died recently in a Montreal hospital at the age of 82. He once headed Riordon Pulp & Paper Co. and became a director of International Paper Co. when that firm absorbed Riordon.

Henry W. Schlenker, 44, head of the Analytical Section of Reichhold Chemicals Inc., died early in June following a long illness.

John J. Hoberg, who with his father founded Hoberg Paper Mills at Green Bay, Wis., in 1896, died recently at the age of 86. He retired from active interest in the company in 1943. (The firm has since been absorbed by Charmin Paper Products Co.)

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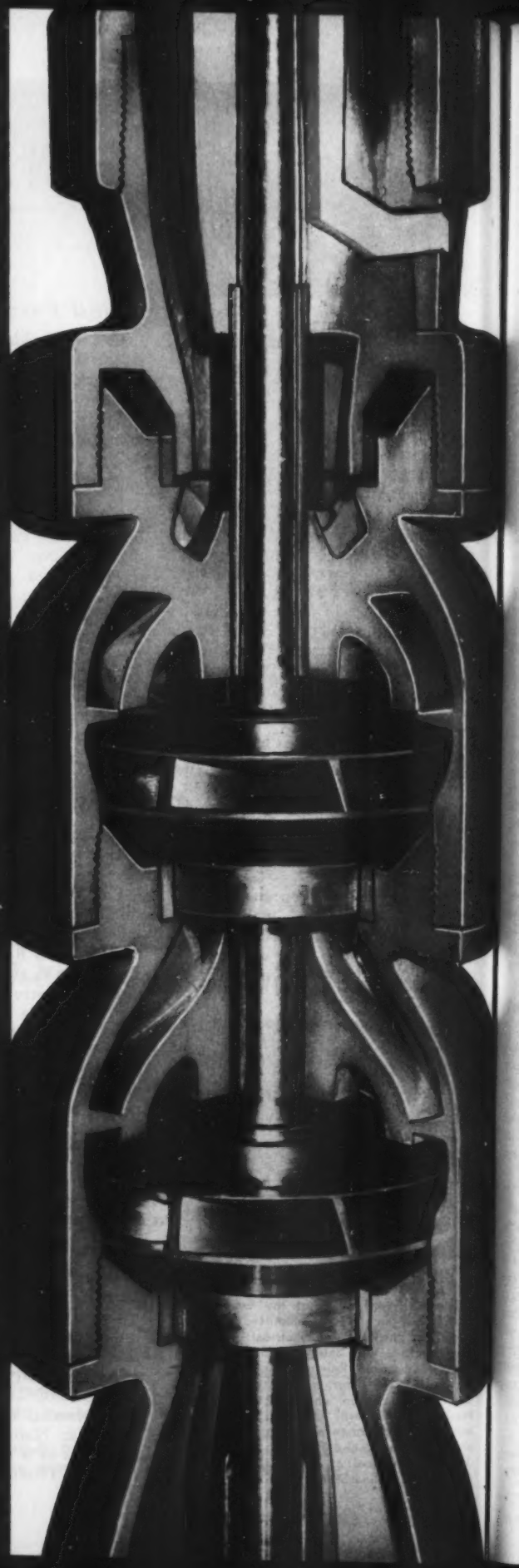

FOREIGN ABSTRACTS

Automatic control in the sulfite process

From a series of trial sulfite digestions in a mill having control instruments, the following general conclusions were reached.

Automatic control gave rise to better pulp quality and higher yield. There was an improvement in the homogeneity of the pulp with fewer variations in viscosity and permanganate number. The pulps were also found to show better bleachability. Cooking time could be shortened, the consumption of chemicals and steam decreased, and sulfur dioxide losses were lower. Because the total costs of the digestions were lowered, this compensated in large measure for the cost of installing the control instruments.

M. S. Voroshilov and O. G. Ioffe. *Bumazh Prom.* **32**, No. 2, 18-20 (1957) (original in Russian); through *Bull. Inst. Paper Chem.* **28**, 970-1 (1958).

Pitch deposits formed in bleaching sulfite pulps

A mill in Sweden manufacturing sulfite pulp and using 20 per cent (by volume) of birchwood chips, found that there were troublesome pitch deposits in the latter stages of bleaching. These pulps were bleached by the usual process involving three stages (chlorine-alkali extraction-calcium hypochlorite) followed by washing with acid. The present paper describes the effects resulting from an additional alkaline extraction prior to the treatment with chlorine.

In less detail, the effect on pitch deposits of substituting a chlorine dioxide treatment for the chlorination was also studied. The authors followed changes in the "sticky" pitch, acetone extractives, TAPPI viscosity and brightness of the fully-bleached pulp. The alkali treatment was highly beneficial on the pitch content and the brightness; the extractives content and the viscosity showed little decrease. Chlorine dioxide gave similarly favorable results, but in this case there was a marked decrease in the extractives content.

Ten references, one table and seven graphs are included. Per Olof Lidby and Lennart Stockman. *Svensk Paperstidn.* **60**, 878-882 (1957) (in Swedish with English summary).

Toxicity of slime controlling agents used in the pulp industry

The author examined seven agents used in paper and pulp mills that have served extensively in slime control with a view towards determining whether these chemicals were toxic towards yearling rainbow trout. All of the reagents studied (and they included several commercial samples of phenyl mercuric acetate, a sample of phenyl mercuric borate, a soluble substituted phenyl mercuric acetate, a methoxy ethyl mercuric chloride, and a product involving chloro- and phenolic compounds) proved to be relatively toxic to fish life. When these toxic agents enter a stream their concentration should be kept down to only several per cent of the toxic concentrations found in the laboratory, because at certain ages, the fish may be even more sensitive to the toxicity of the agents than were the yearlings tested. This is particularly true when effluents containing the slime-controlling chemicals are but little diluted by the stream itself.

Four tables and 25 references are included. H. A. Stammer. *Das Papier* **12**, 14-44 (1958), (in German).

Determining suitability of pulps for acetylation

An acetylation procedure is described that can be applied to 15-gm. samples of a pulp. The latter is conditioned at least 24 hrs. at 65-per cent relative humidity at 22° C, then disintegrated in a Waring blendor and pretreated with 105 ml. acetic acid, stirred and rotated 16 hrs. at 20° C.

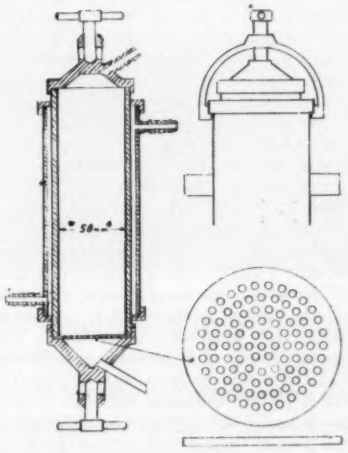

Fig. 1

It is then acetylated with 102 ml. cold (5°) acetic anhydraide, 4.6 gm. sulforic acid and 100 ml. acetic acid at 34° C with stirring at 100 rpm. During this carefully-standardized acetylation, at intervals, falling glass sphere viscosity determinations are made both on the unknown pulp and on a pulp taken as standard.

At the end of an acetylation, the viscosities should be nearly identical (± 5 per cent). When this acetylation (to the triacetate) is complete (after about 5 hrs.) the flask is cooled and its contents stirred into a mixture of 115 ml. 80-per cent acetic acid and 1.6 gm. sodium acetate for every 100 ml. of solution. This mixture is then rotated 30 min. at 20°. This triacetate solution (which is not converted into the diacetate) is then subjected to the following fully-described measurements: falling sphere viscosity, filterability in the apparatus shown in Fig. 1, examination of undissolved fibers, turbidity and light transmission of the filtered solution.

The filtration value (F) is calculated as $A_x/A_s \cdot 100$ (where A_x is the weight of solution filtered in a certain time and A_s the weight of solution from a "standard cellulose" filtered under identical conditions).

Three wood pulps were examined, and these represented excellent, fair and poor acetylation grades. The precision of the filterability procedure was checked by standard statistical methods. Filterability and undissolved fibers (shown graphically) showed the marked differences between the three pulps. Fields of application are discussed.

Twelve references, one figure and four graphs are included. Gerd L. Borgen *Norsk Skogind.* **11**, No. 12, 522-526 (1957) (in English).

Detection of carboxymethyl cellulose in rosin size and paper

The following test applies to cellulose derivatives generally and to other carbohydrates, so the sample must be free from such substances as sugars, starch and plant gums. However, these are seldom found in rosin size, whereas carboxymethylcellulose may be present.

A few milligrams of the test material (I), treated with a drop of phosphoric acid, is placed in a high-walled porcelain micro-crucible which is covered with a small piece of filter paper that has been impregnated with aniline acetate solution. This in turn is covered with a small watch glass. (I) is then carbonized cautiously within about 30 sec. When cellulose derivatives were originally present in (I), a red spot is formed on the paper — due to formation of the dianilide of hydroxyglutaconic aldehyde.

A more satisfactory test for carboxymethylcellulose depends upon its conversion into glycolic acid by means of 50 per cent sulfuric acid. When glycolic acid is degraded, it yields formaldehyde which is readily detected by means of chromotopic acid (4,5-dihydroxynaphthalene-2,7-sulfonic acid) (II). The test is carried out as follows. (I) (10-100 milligrams) is refluxed 3-4 hrs. with 5 ml. 50 per cent sulfuric acid, diluted with 10 ml. water, re-

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heated, made faintly alkaline with concentrated caustic soda, filtered, decolorized (if necessary) with carbon, refiltered, evaporated nearly to dryness on a steam bath, then dried briefly at 105° C. The residue when treated with a small amount of (II) and a few drops of sulfuric acid gives a purple color due to formaldehyde. If the original material contains other substances that readily evolve formaldehyde, (I) must be acidified and steam distilled before the test for carbonxymethylcellulose is carried out.

A fully described modification of the test for carboxymethylcellulose in paper containing casein with (II) shows that this can be made quite specific for carboxymethylcellulose. The latter can also be detected by treatment with benzoyl peroxide, which converts the methoxyl groups into formaldehyde.

The various tests are well described in F. Feigl's "Spot tests in organic analysis" 5th Ed. Elsevier Publishing Co. Six references. F. Blechinger. *Wochbl. Papierfabrik* **86**, 79-81 (1958) (in German).

Molecular weights of native celluloses

By nitrating directly and under mild conditions, a series of cellulosic raw materials was converted into the nitrates with a minimum of degradation.

The author then made intrinsic viscosity measurements of these nitrates in n-butyl acetate, as indicated by linear extrapolation using Martin's equation (*Tappi* **34**,363 (1951). In this the constant (K) varied between 0.17 and 0.23. These viscosities were adjusted to a trisubstituted nitrate, but no attempt was made to refer them to a constant rate of shear. The raw materials included cotton, kapok, milkweed floss and stalks, flax, hemp, jute and ramie, corn stalks, wheat straw, the celluloses of aspen, beech, white and yellow birch, elm and red maple, balsam fir, eastern red cedar, eastern hemlock, jack pine, white spruce and tamarack. Similar measurements were carried out with seven cellulose nitrates ranging in average D.P. from 9000-10,700 as determined by light-scattering measurements made separately by Goring, Huque and Mason (unpublished data).

From the relationships thus established between η and P_w, the weight average D.P. of the various native celluloses was established. Cotton, milkweed floss and hemp had a D.P. of about 10,500; kapok, flax, jute and ramie and the stalk of milkweed had D.P.s ranging from 9000-10,000. The values for the hardwood celluloses were in the range of 6500-9000. The celluloses of the conifers ranged from 6350-9300. Cornstalk and wheat straw celluloses showed D.P.'s respectively of 5850 and 7050.

It is possible that some of the wood celluloses were degraded in the course of nitration. The author believes that in general native celluloses show about the same average molecular weights irrespective of their source. The present D.P. values are much higher than some of those reported previously for the same materials, owing presumably to more or less severe degradation.

Twenty-six references, three tables and two figures are included. T. E. Timell. *Svensk Papperstidn.* **60**, 836-42 (1957) (in English).

Biological effects of various fractions of kraft mill effluents

Samples of black liquor from the kraft cooks of pine, alder and pine-alder mixtures and wheat straw were examined for percentages of sodium hydroxide, sodium sulfide, total solids, ash and organic matter, as well as for B.O.D. and color intensities. In these various liquors the mineral and organic matter did not differ too significantly, but the black liquor from hardwood pulp had a color intensity twice as great as that from softwood pulp. The black liquor from straw pulp showed a high B.O.D., which was 3.5 times as great as that obtained in the case of the other samples.

The thresholds of organic matter for the development of certain types of bacteria were found to be 5 - 8 mg. per liter with color-intensity indices of under 1. The toxicity threshold to fish was 400 to 900 mg. per liter. Concentrations of turpentine and its components in black liquor were well below the level of toxicity. It was found that the degree of stream pollution of kraft mill effluents depended on the efficiency of recovery processes, which were in turn determined by the technological know-how of the mill. Recovery efficiency could be measured by losses in such inorganic chemicals as sodium sulfate and sodium carbonate.

French stream pollution laws state that in the liquors discharged suspended matter should not exceed 30 mg. per liter, total nitrogen should not be over 10 mg. per liter, the B.O.D. not more than 40 mg. per liter, and that bacteria should be absent. This would mean that the loss of inorganic components should not be greater than 10.75 kilograms per ton of pulp—a condition reached only in mills equipped with modern recovery systems.

In the case of mills using straw as the raw material, the B.O.D. of the effluents exceeds the permissible limit even with the best recovery systems. The results show the vital importance of developing economic techniques for purifying effluents.

R. Berthier, M. Fournier and A. Legrand. *Chim. & Ind.* (Paris) **78**, 417-22 (1957) (original in French); through *Bull. Inst. Paper Chem.* **28**, 912-3 (March 1958).

Yields of spruce and beech sulfite pulps computed by D.P. measurements

Previous studies showed that there was a relationship between the average degree of polymerization (D.P.) of unbleached spruce sulfite pulps and the bleached pulp yields. These have been extended so as to include beechwood sulfite pulps as well and to supply further data on spruce pulps. There is a (nearly) linear relationship between D.P. and yield in the case of spruce as well as beech, but in the latter case this linearity is limited to pulps whose D.P. values are below 1500 and above 500. Above and below these values, the results are somewhat erratic.

The bleached pulp yields for spruce can be approximated from the equation: Yield (% based on the wood) = [DP/100]

0.75 + 38.0. In the case of bleached sulfite beech pulp, Yield = [DP/100] 0.55 + 36.7. Thirty-eight cooks were made with spruce and 31 with beechwood in arriving at these data. After discussing this relationship, various possibilities for its industrial applications are suggested.

Precision and errors are also described. Alfred Ogait. *Das Papier* 12, 126-136 (1958) (in German).

Differentiation between bleached sulfite and kraft pulps

Up to the present, the *unequivocal* distinction between bleached kraft and sulfite pulps has been impossible. The suggestion was made that fluorescence microscopy be used in such a study. However, the authors found that fluorochromation with basic dyestuffs (based on differences in carboxyl content of the pulps) was unsuccessful when applied to mixtures of individual fibers.

The method suggested by Agahd [*Wochbl Papierfabr.* 40, 170 (1942)] in which a mixture of dyes was used was found applicable when *dried* heavy pulp sheets were stained in a specific area. Sulfite pulps showed a pink fluorescence and kraft pulps a blue fluorescence. Similar differences were noted when a mixture of Rhodamine B extra and Thioflavin SFW (in 0.05-per cent solutions) were used. The variations in color are ascribed to the differences in mobility of the Rhodamine through the pulp sheets and appear to be due to the different distribution of carboxyl groups within the cell walls of the fibers themselves. That is, the carboxyl groups of the sulfite pulps are on the surface of the fiber; those of the kraft pulps are distributed more evenly throughout the fiber wall.

The article is illustrated by three photographs in full color. Twenty-three references are also given. Georg Jayme, Gerhard Bauer and Marianne Harders-Steinhäuser. *Das Papier* 11, No. 23/24 536-9 (1957) (in German with English and French summaries).

Tensile strength of paper

Techniques for measuring the breaking load and computing the breaking length of paper are described. However, the value of the breaking length as a measure of the "intrinsic strength" of paper is questioned. When applied to papers of various grades and different basis weights, it leads to erroneous evaluations.

What appears to the author to be a better measure of intrinsic strength is the "breaking load per unit of cross sectional area", i.e. in terms of kilograms per square centimeter (or square millimeter). This is a test which, although applied to boards, has not been applied to paper sheets because of technical difficulties in getting accurate measurements of paper thickness. On the other hand, the methods used for measuring thickness and available data showed that the accuracy attained was adequate for the practical evaluation of intrinsic strength.

V. A. Gulyanitskii. *Bumazh. Prom* 32 No. 3, 7-10 (1957) (original in Russian); through *Bull. Inst. Paper Chem.* 28, 986 (1958).

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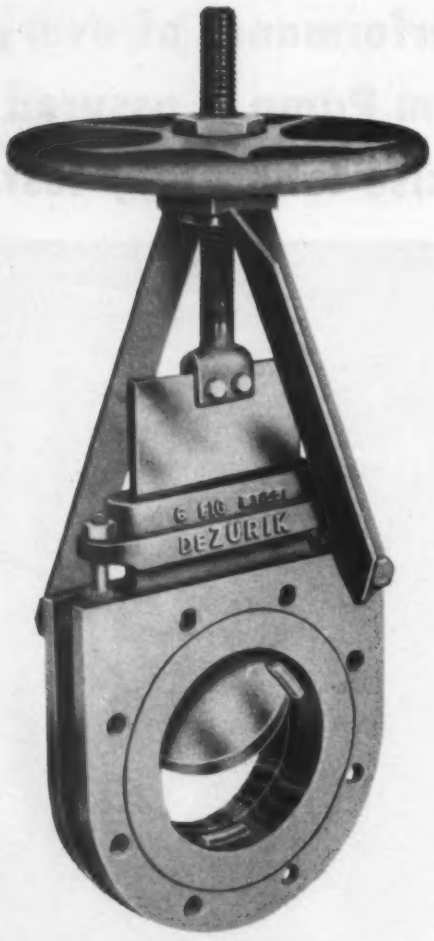

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PATENT REVIEWS

MELVIN NORD*

CORRECTION

The patent, "Refiner apparatus for removing wax, tar, asphalt and plastic from paper pulp", appeared in our June issue with the wrong patent number. The number read: U.S. 2,383,981. It should read U.S. 2,838,981.

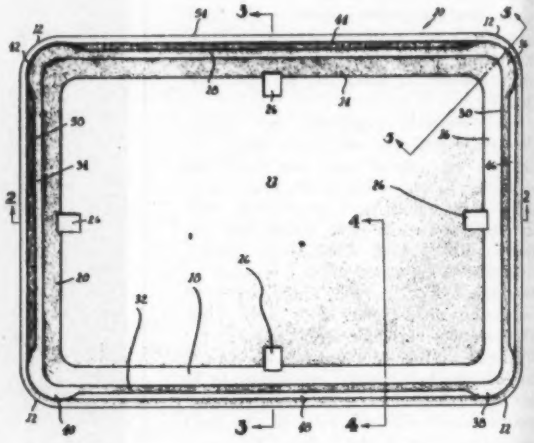

Fig. 1

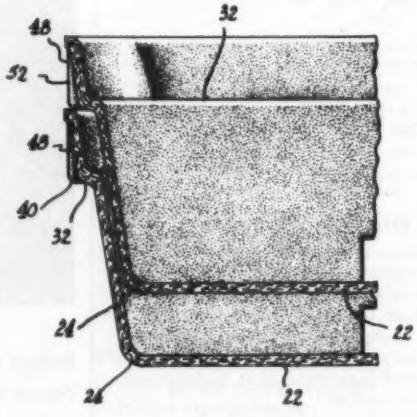

Fig. 2

Molded pulp plant container

U.S. 2,814,427, issued Nov. 26, 1957, to Richard L. Emery and assigned to Keyes Fibre Co., provides a container made of molded pulp which is adapted to hold potting earth for growing plants and which, when not in use, may be nested within other similar containers.

Fig. 1 shows a top view of the container, and Fig. 2 shows a pair of containers in the nested position.

Conveyor system for pulp dryers

U.S. 2,821,285, issued Jan. 28, 1958, to Frederick W. Hooper and assigned to Ross Engineering of Canada Ltd., provides im-

*Patent attorney, 17600 Pinehurst, Detroit 21.

provements in the conveyor system for conveying paper pulp sheets through a pulp dryer.

With the present arrangement the need for manually transferring the sheet from one course to another is eliminated. The complicated and heavy arrangement of chains and rods is avoided. Furthermore, the conveyor can be run at speeds greatly exceeding those previously possible.

Method of making a papermaker's felt

U.S. 2,821,771, issued Feb. 4, 1958, to John D. Skeer and assigned to F. C. Huyck & Sons, describes a method of making papermakers' felts from synthetic fibers. According to the inventor, such felts have great dimensional stability and a life far in excess of that of the best of woolen papermakers' felts. The synthetic fibers which may be used include nylon, saran, Orlon, dynel and Dacron.

A fabric is first woven tightly from the synthetic yarn. This fabric is then immersed in water while applying longitudinal tension, thus causing transverse shrinkage of the fabric. The shrunken fabric is then dried and heated under longitudinal tension at a temperature low enough so that the crimps remain stable.

Suction roll for papermaking machines

U.S. 2,823,593, issued Feb. 18, 1958, to Herbert Holden, assigned to Beloit Iron Works, relates to the suction rolls of papermaking machines.

An object of the invention is to reduce the deflection arising from the applied suction and, therefore, to reduce the tendency to greater wear toward the center of the fixed longitudinal sealing strips. A further object is to reduce the power necessary to drive the roll.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Folding paperboard display carton	Continental Can Co. Inc.	2,818,971	1/ 7/58
Pallet and skid reinforcement	Crown Zellerbach Corp.	2,818,972	"
Dispensing carton	Sidney A. Boguss et al	2,819,000	"
Fiber drum with metal bottom end having center support	Continental Can Co. Inc.	2,819,007	"
Shipping container	Lawrence Paper Co.	2,819,008	"
Retaining notch for a container	Crown Zellerbach Corp.	2,819,009	"
Sheet feeding device	International Paper Box Machine Co.	2,819,077	"
Sheet feeding mechanism	Kimberly-Clark Corp.	2,819,079	"
Wood chip conveying system	William T. S. Montgomery	2,819,123	"
Recovery of chemicals from residual liquors	Babcock & Wilcox Co.	2,819,150	"
Production of paper carrier sheet for thermoplastic and elastic film	S. D. Warren Co.	2,819,181	"
Production of cast surfaced coated paper	S. D. Warren Co.	2,819,184	"
Machine for making paper bands	Ellen J. Peterson	2,819,657	1/14/53
Apparatus for curling edges on paper drinking cups	Continental Can Co. Inc.	2,819,658	"
Paper cup body forming apparatus	Continental Can Co. Inc.	2,819,659	"

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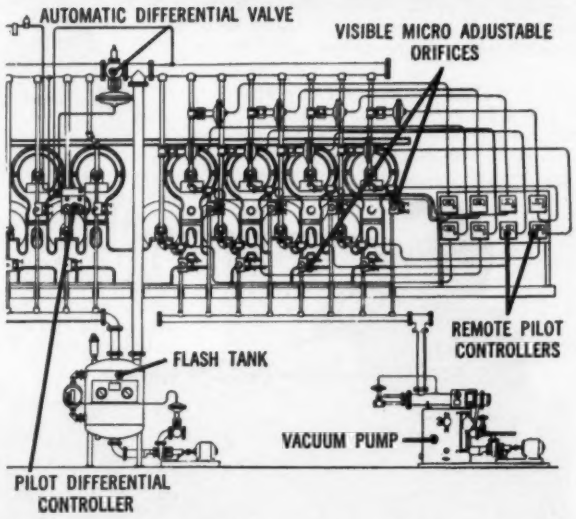

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Paperboard products get a real lift with TITANOX*. Packaging with greater point-of-sales appeal . . . book and magazine stocks with greater contrast and less show-through . . . opacified glassines and waxed papers with high legibility—all share in the matchless whitening, brightening and opacifying power of TITANOX titanium dioxide white pigments.

To achieve these results, papermakers can choose from among such white pigments as TITANOX-A-WD, TITANOX-C-50, or TITANOX-RA-50. Whether used at the beater or in the coating, TITANOX white pigments insure easy mixing, complete dispersion and uniformity of all properties. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities.

TITANIUM PIGMENT CORPORATION

Subsidiary of **NATIONAL LEAD COMPANY**

*TITANOX is a registered trademark for the full line of titanium pigments offered by Titanium Pigment Corporation.

5729

NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Centriscreen

In announcing this item in our June issue, an error was made concerning the size of this unit. The sentence reading: "Occupying only 2 sq. ft. of floor area", should read "Occupying only 22 sq. ft. of floor area".

This unit provides 30 sq. ft. of screening surface in the form of two concentric, rigidly-supported stainless steel screening cylinders. The screens remain stationary, and the stock flows down and inward through the inner screen, outward through the outer screen. The screen surfaces are kept clean and open by double hydrofoils, two for each screen cylinder. *Bird Machine Co.*

Circle No. 11 on Readers' Service Card

Anion unit bed support

An anion unit bed support that eliminates the need for subfill media and substantially reduces final anion unit rinse requirements is now available to the industry.

This design provides for the replacement of subfill media by specially-designed anion unit lower internals. These lower internals, similar to those used in mixed-bed demineralizers, incorporate a unique corrosion-resistant bed support medium that allows the passage of water in either direction while retaining the resin. The bed support also provides for uniform collection and distribution over the entire cross sectional area of the unit. *Graver Water Conditioning Co.*

Circle No. 12 on Readers' Service Card

New deamidated zein for coatings

Zein, the versatile protein from corn, can now be effectively dispersed in water by weak alkalies. A new product, Zein G210, has just been developed that does not require strong alkali or organic solvents to disperse it in water.

The new modified product can be successfully used as a grease-resistant coating for paper. It produces hard, tough, grease-resistant films that are non-thermoplastic. *Corn Products Sales Co.*

Circle No. 13 on Readers' Service Card

Non-shrink grout and concrete patching mortar

Non-shrink Embeco, a well-known product of Master Builders Co., is now available in ready-to-use form. The two formulations—Embeco pre-mixed grout and Embeco pre-mixed mortar—are designed for many applications within the industry. *Master Builders Co.*

Circle No. 14 on Readers' Service Card

Electromagnetic disc brake

An AC brake with Underwriter's Laboratories approval for both Class 1 Group D and Class 2 Groups E, F and G is available.

It is designed for mounting on the NEMA "C" mounting flange of fractional horsepower electric motor frames 56-C and 66-C and integral motor frames 182 and 184. Any AC voltage 110 through 550, 25, 50 or 60 cycles, including dual voltages, is available in the new series. *Stearns Electric Corp.*

Circle No. 15 on Readers' Service Card

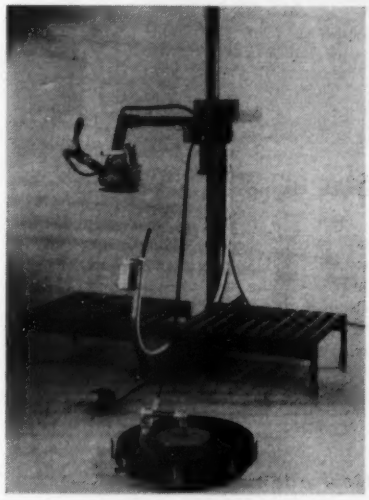
Rust prevention and removal

Manganesed-Phospholene No. 7 is the name given to a new product that dissolves rust and combines chemically with metal surfaces to form a rust-inhibiting coating—thus resisting further rusting and corrosion.

This product can be brushed or sprayed on machinery wherever rust accumulates. The metal should be free from oil, grease or other foreign matter. One application is said to be sufficient if the rust is not heavy. The rust will dissolve, states the company, no matter how heavily encrusted. All possible rusting agents are thoroughly destroyed and removed, and a rust-inhibiting coating will form on the metal surface.

Paint, lacquer, enamel, plating or other coatings anchor securely to metal after it has been treated and will not peel off. *Western Reserve Laboratories.*

Circle No. 16 on Readers' Service Card



Feed unit for steel strapping

A new power strap feed unit has recently been announced. This feed unit (known as the E41) is said to feed steel strapping around a package at the rate of 5 ft. per second, eliminating the necessity of the strapping operator walking around the package to encircle it with strapping or stationing a second man on the other side of the package. The unit can feed strap around any package up to 56 in. high and 48 in. wide.

Any one of a complete line of steel strapping tool mounts, depending on the strapping tool to be used, can be attached to the unit. *Acme Steel Co.*

Circle No. 17 on Readers' Service Card

Photoelectric edge guide

A relatively new photoelectric edge guide unit has been successfully used in controlling lamination operations by a leading eastern paper converter to eliminate waste and insure accurate lamination and trimming.

The unit is used to guide the several sheets before lamination in a heat-sealing

New Products . . .

machine. It controls both transparent and opaque films and papers. The guide is known as the Edgetron. *Intercontinental Dynamics Corp.*

Circle No. 18 on Readers' Service Card

Truck dumper

Here is a hydraulic truck dumper that has recently been installed in a southeastern wood pulp mill. This 50- × 10-ft. unit is in the act of unloading a large tractor-trailer load of wood chips. The platform tilts to 50° by means of powerful hydraulic cylinders that are actuated by a power unit. *Screw Conveyor Corp.*

Circle No. 19 on Readers' Service Card

New additive

Hodag WR-301 is a new Hodag additive designed specifically for pulp and paper mill operations. WR-301 is a flaked product that is used to improve sheet formation, aid in fiber dispersion and improve drainage on fourdrinier machines. It is also used to prevent foam and in preparing coating mixes. It is an instant antifoam in concentrated flake form that is simply added to water to emulsify immediately. *Hodag Chemical Corp.*

Circle No. 20 on Readers' Service Card

Pliability tester

A new Avisco pliability tester has been developed that works on the principle that the pliability of cellophane is a function of its moisture content.

A strip of cellophane to be tested is fixed to one end of a lever and a uniform weight is applied to the other end. As the film stretches its elongation is automatically recorded at predetermined time intervals. The weight can be adjusted for various film gauges, and the timer can be set for different periods of dwell time. *F. F. Slocomb Corp.*

Circle No. 21 on Readers' Service Card

Ratogate valve for flow control

A non-plugging handwheel-operated Ratogate valve for flow control of pulp stock and other slurries has just been introduced.

The manual valve is an addition to the company's line of pneumatic- and electric-operated flow control valves.

The valve is offered with either an iron or stainless steel body, both having a stainless steel gate and stem. Connection sizes available are 3, 4, 6, 8, 10 and 12 in. with flat face A.S.A. flange drilling. *Fischer & Porter Co.*

Circle No. 22 on Readers' Service Card

Glass-fiber insulation

Known as Therma-K exterior duct and equipment insulation, this new lightweight insulation was designed for applications where temperatures range from sub-zero to 350° F.

Low thermal conductivity permits less thickness for equal operating efficiency. Light weight means low density for easier trimming and installation. The company also states that the glass fibers do not warp, shrink, rot, buckle, burn or support combustion. This will result in long life of the insulation and also reduce fire hazard and minimize maintenance. *Ebret Magnesia Mfg. Co.*

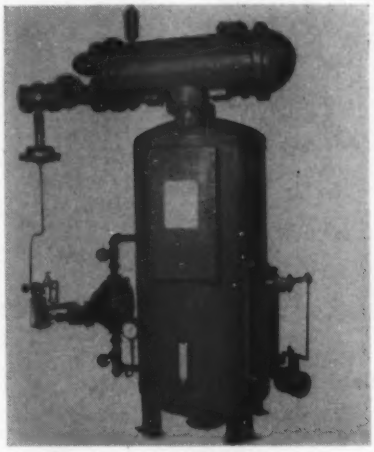
Circle No. 23 on Readers' Service Card

Primers for use in laminating

The development of specially-formulated adhesion primers is expected to find wide use both in extrusion coating of polyethylene as well as in the converting of polyethylene-coated papers or laminations into bags, pouches and other forms of packaging.

These promoters are said to facilitate adhesion at lower extrusion temperatures, give more uniform adhesion, more slip, lower odor and better aging and heat seal bonding. *National Starch Products Inc.*

Circle No. 24 on Readers' Service Card



Liquid level control

More accurate control of water admitted to feed-water heaters is now possible thanks to a new pilot-operated liquid level control.

While float controls normally used on feed-water heaters permit fluctuations of water level in storage section up to 12 in., the new control maintains any desired level

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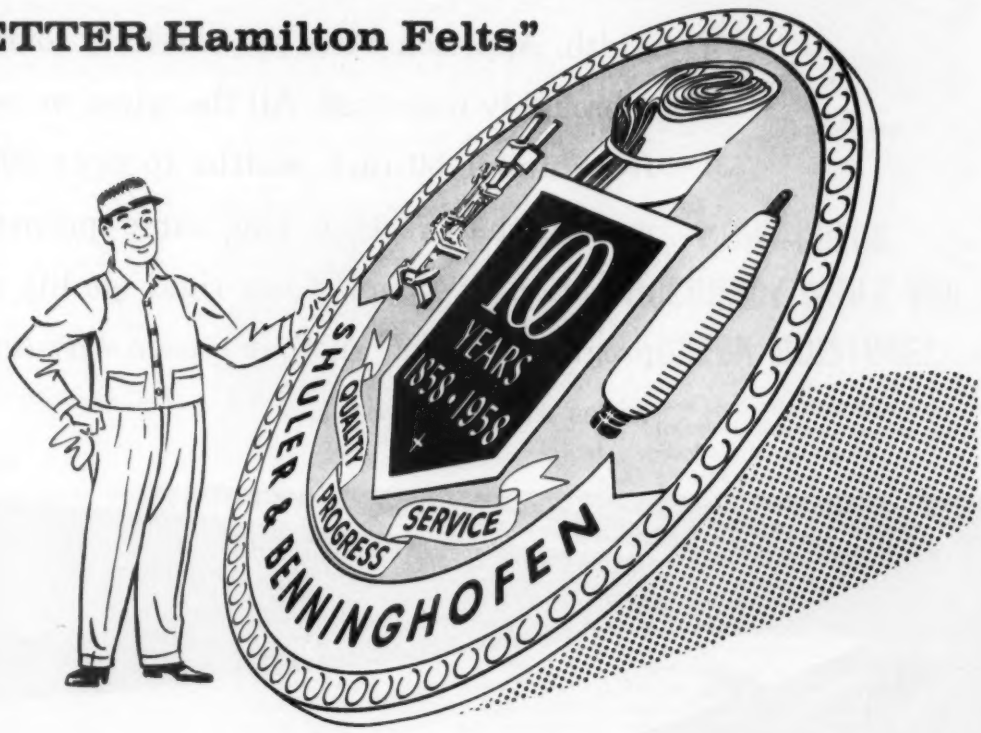

"QUALITY . . . SERVICE . . . PROGRESS."
These words—appearing on our 100th Anniversary Seal—sum up the philosophy which has guided us since our founding in 1858 by J. W. Benninghofen and Asa Shuler. They epitomize our pledge to the paper making industry for the years to come.

Every operation in the manufacture of Hamilton Felts—from the selection of wools through the finishing process—is still characterized by the same proud craftsmanship as in those earlier days.

But today's Hamilton Felts also incorporate the results of our continuing program of technical improvement—permit operators to run machines faster with fewer stops, less broke . . . they remove more water faster and deliver drier sheets to the driers.

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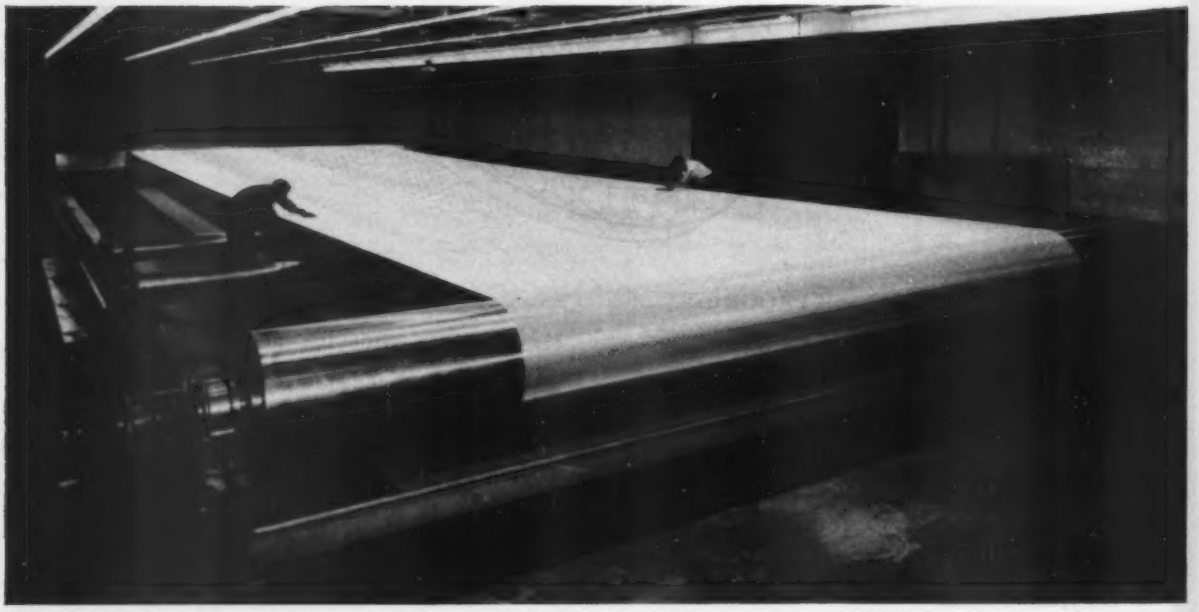
On this giant finishing table (one of seven), capable of finishing wires up to 410 inches in width, Appleton wires are carefully conformed, thoroughly inspected. All the wires we weave—from under 50 inch widths to over 300 inch mammoths—receive the same painstaking attention. It's part of our rigid quality control program . . . and another reason why Appleton wires are good wires.



Appleton's Fourdrinier wire pioneering is exemplified by our tin coated wires for corrosion resistance, and Mangaloy wires for greater resistance to abrasion. Ask your Appleton Wire Works representative for details. Appleton Wire Works, Inc. General Offices, Appleton, Wisconsin. Plants at Appleton and Montgomery, Alabama. International Wire Works, Menasha, Wisconsin, an affiliated company.

APPLETON WIRES ARE GOOD WIRES

New Products . . .

within 2-1 in. plus or minus the setting.

The control consists of exterior float, pneumatic pilot and diaphragm motor valve. Slightest float movement causes the pilot to apply or release pressure on the diaphragm motor valve to open or close the feedwater inlet.

By equalizing the flow of water into the heater, the new control helps solve three common problems. It prevents sudden and excessive demands for both water and steam and stops overloading of water treating equipment. At the same time, it provides greater uniformity in temperature and oxygen content of water sent to the boilers.

The new control is offered as optional equipment on Stickle feedwater heaters in capacities from 3000-300,000 lb. per hour. *Stickle Steam Specialties Co.*

Circle No. 25 on Readers' Service Card

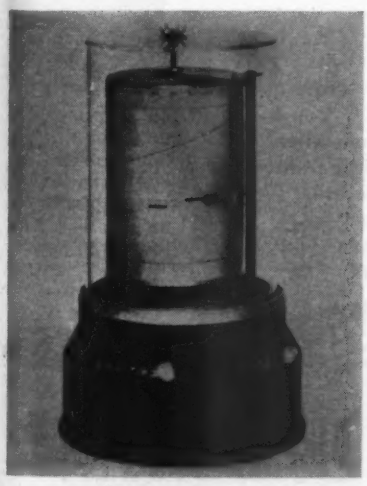
Rubber compound

A new extremely hard general purpose compound is now available for commercial use.

Designated as Union Carbide XK-1039 Silicone rubber compound, this material is said to have low compression set, low moisture absorption, high temperature stability, good release properties and does not require the use of toxic additives. It can be molded, calendered or extruded.

This compound is particularly suited for fabrication of rubber rolls that are used in the textile, plastics, paper and printing industries. *Silicones Div., Union Carbide Corp.*

Circle No. 26 on Readers' Service Card



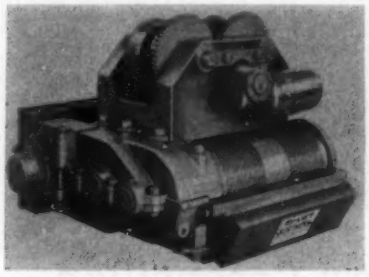
Efficiency recorder

Here is a new tool for management, engineers and operators. With simplicity and accuracy, a chart shows the "on" (or productive time) as well as the "down time". It is continuously readable for every instant in percentage of time over the entire shift, be it 8 hrs. or 31 days.

With this unit, it is no longer necessary to wait until the end of a work shift or time period and have someone make charts and computations on productivity of operators, machines or processes. By having this information at once, many problems can be anticipated and lowered production avoided.

The company offers you complete information on this unit that gives operation data, application data and cost. *Gorrell & Gorrell.*

Circle No. 27 on Readers' Service Card



New model hoist

The above photograph appeared upside down in the May issue of THE PAPER INDUSTRY. We regret the error.

The picture, now in its correct position, shows a new model of the Northern Hi-Lift hoist. These heavy-duty models have rugged features. The compact design and arrangement allow the maximum approaches with minimum space requirement. They are also designed for moderate speeds and for single or variable speed control. A worm drive provides smooth, quiet and trouble-free operation.

The hoist has a capacity from 2-15 tons. *Northern Engineering Works.*

Circle No. 28 on Readers' Service Card

Thermopruf kiln chain

A new, scientifically-designed link shape for Thermopruf kiln chain has been introduced to reduce operating and maintenance costs in the application of wet process cement kilns, lime sludge kilns and wash mills.

The chain is available by the link or in lengths complete with end links to meet specific chain system requirements. *Allis-Chalmers Mfg. Co.*

Circle No. 29 on Readers' Service Card

Hydraulic pressure unloading pump

Production of a new hydraulic pressure unloading pump has been announced. This pump is designated as type "ANP".

When the adjustable preset pressure is reached on applied work, the control hydraulically reduces the pump volume to slip stroke to save input power, reduce heat and hold the pressure.

The pump may be supplied for either clockwise or counter-clockwise rotation. It

NOW—CHECK ACCURACY WHILE YOU CHECK MOISTURE!

New Electronic Moisture Registers have first "built-in standard" in a 3-second, portable moisture tester.

NOW DIAL ACCURACY IS ASSURED, even under the extremes of production-line use. With *self-checking standard*, Moisture Register's new Model 5's are checked and adjusted for calibration accuracy right on the job—by any untrained operator. He simply fits electrode to standard. Then with new trimmer he sets dial for perfect alignment. Gives calibration adjustment *in the field*. You get practical accuracy down to 0% . . . 3-second spot tests for moisture wherever your product may be. Portable, light weight, battery operated, new rugged construction with miniature tube. Factory-set to your needs.

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Please send data on new Model 5's.

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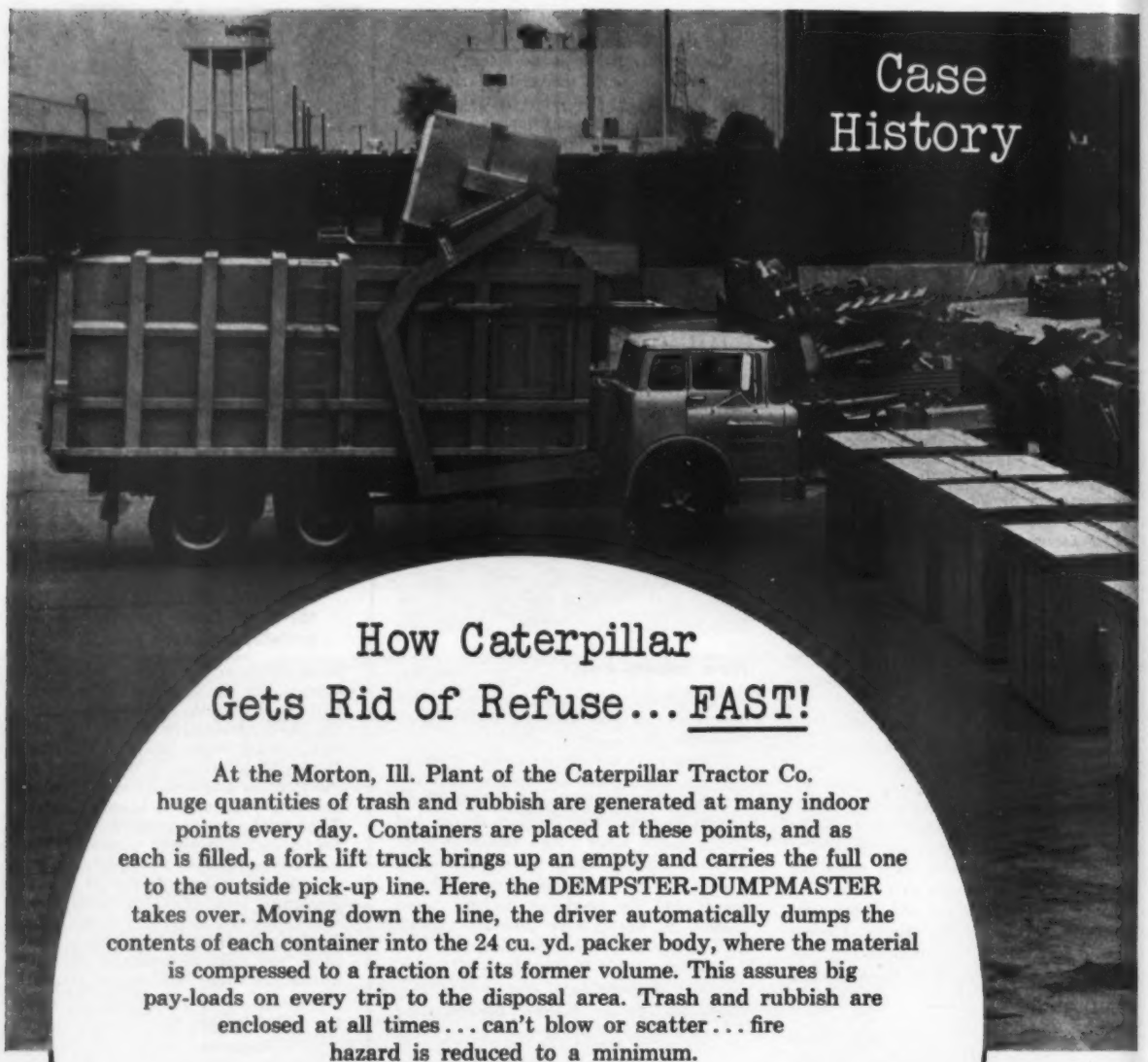

How Caterpillar Gets Rid of Refuse... FAST!

At the Morton, Ill. Plant of the Caterpillar Tractor Co. huge quantities of trash and rubbish are generated at many indoor points every day. Containers are placed at these points, and as each is filled, a fork lift truck brings up an empty and carries the full one to the outside pick-up line. Here, the DEMPSTER-DUMPMASTER takes over. Moving down the line, the driver automatically dumps the contents of each container into the 24 cu. yd. packer body, where the material is compressed to a fraction of its former volume. This assures big pay-loads on every trip to the disposal area. Trash and rubbish are enclosed at all times... can't blow or scatter... fire hazard is reduced to a minimum.

THE DEMPSTER-DUMPMASTER

The DEMPSTER-DUMPMASTER is economical! One-man operation. Big pay-loads from 50 to 100 cubic yards. It's safe! Clearance lifting arms never pass the cab windows, can't injure the operator. It's versatile! Handles containers below grade or from docks. Can be used for manual loading routes. Containers available in one through six cubic-yard capacity, with or without casters.

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New Products . . .

is built for face, right angle bracket or adapter mountings as well as standard or custom-built pump and motor base reservoirs. *Oilgear Co.*

Circle No. 30 on Readers' Service Card

Walkie platform truck

This 24-volt, 4000-lb. capacity walkie platform truck has been designed as an unusually compact power unit.

The compact design is made possible by using four 6-volt batteries for power, two mounted on each side of the drive unit. The batteries are connected so the truck may move forward or in reverse in three separate speeds. Speeds are increased or decreased by varying the truck voltage rather than by adding resistors to the electrical circuit. *Raymond Corp.*

Circle No. 31 on Readers' Service Card

Low molecular weight polymer

A-C Polyethylene is a low molecular weight polymer available in hot melt and emulsifiable forms in both uniform cube and atomized grades. This unique form of polyethylene is used in injection molding, polishes, wax-blending, textile finishing, paper coating, corrugated carton coating, inks, paints, etc. *Semet-Solvay Div., Allied Chemical Corp.*

Circle No. 32 on Readers' Service Card

Polyacrylamide-type flocculant

Production of an improved polyacrylamide-type flocculant known as Separan NP10 has been announced. Included among product improvements are higher purity, increased solution clarity and greater product uniformity.

In the pulp and paper industry Separan NP10 is used as a high-speed flocculating agent in such applications as filler retention, process water clarification, white liquor clarification and in flotation-type savealls. Separan NP10 is also successful in chemical processing and water treatment. *Dow Chemical Co.*

Circle No. 33 on Readers' Service Card

Fluorescent inks

A complete line of DAY-GLO fluorescent printing inks for each major printing process is now available for use in versatile packaging.

Complete information, free color proofs and printing instructions are available to you. *Switzer Brothers Inc.*

Circle No. 34 on Readers' Service Card

Electronic motor operators

A new line of electronic motor operators has been introduced to the industry. The units are designed for the proportioning control of dampers or valves in heating, ventilating and air conditioning systems. The motor operator is a heavy-duty reversible shaded pole motor, with motor and gear completely submerged in oil and sealed in a die case. Standard units deliver up to 220 lb.-in. torque at a timing of 130 sec. per 180° stroke.

Motor operator operates on 115v, 60 cycles, with an input of 32 watts. *Barber-Colman Co.*

Circle No. 35 on Readers' Service Card

Steelstrap dispensers

One of the simplest and easiest operating steelstrap dispensers is now being manufactured.

Known as the Acme Steel E33 Steelstrap Dispenser, this unit weighs 12 lb. and requires only a slight effort to operate. It can be loaded with a coil of steel strapping by one man in less than a minute.

The new dispenser will handle any steel strapping size from ⅜ in. × .010 in. to ¾ in. × .023 in. It is standard equipment on the E41 power strap feed unit. It can be purchased separately for use with any steel strapping equipment. *Acme Steel Co.*

Circle No. 36 on Readers' Service Card

NEW LITERATURE

Books

KNOW YOUR PACKAGING MATERIALS. Published by Packaging Div., American Management Association Inc., 1515 Broadway, Times Square, New York 36, N.Y. Price: $3.00 (AMA members: $2.00).

Packaging is recognized as a dominant marketing factor in today's dynamic economy. The increasing variety and quantity of products, new merchandising and distribution patterns and changing consumer demands have spurred the development and improvement of packaging materials and applications.

To help management keep pace with these developments, AMA's Packaging Div. has sponsored a revised edition of this book. This edition represents a fresh and up-to-date approach. More than half of the original papers have been completely rewritten. More than 22 tables, charts and illustrations have also been added.

LUMBER. By Nelson C. Brown and James S. Bethel. Published by John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y. 379 pages. Price: $9.00.

This is the second edition of this book. In the period which has elapsed since the first edition of this text many technical advances have been made by the lumber industry. Increased labor costs, a steadily decreasing quality of raw material and continually greater competition from other materials for markets have necessitated these changes in methods and procedures. A revision of the original text became necessary to reflect this changing industrial scene.

A new chapter on quality control is one of the most significant additions to this new edition.

USDA Reports

TECHNICAL NOTES AVAILABLE. Here is a list of four Technical Notes available from the Lake States Forest Experiment Station:

No. 522—Net Timber Volume by Species and Counties on Commercial Forest Land in Minnesota.

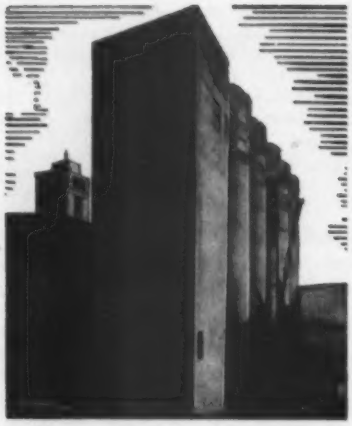
No. 523—Cutting Methods Affect Snow Accumulation and Melt in Black Spruce Stands.

No. 524—A Red Pine Plantation Problem in Upper Michigan.

No. 525—Height Growth is Indicative of the Relative Frost Resistance of Hemlock Seed Sources.

Copies of these Technical Notes are available by writing to Director, Lake States Forest Experiment Station, U. S. Department of Agriculture, St. Paul 1, Minn.

ANNUAL REPORT 1957. The Southeastern Forest Experiment Station of Asheville, N. C., has compiled a 75-page annual report briefly presenting selected accomplishments in its research program during 1957. The main chapter headings include: Forest Management, Forest Economics,



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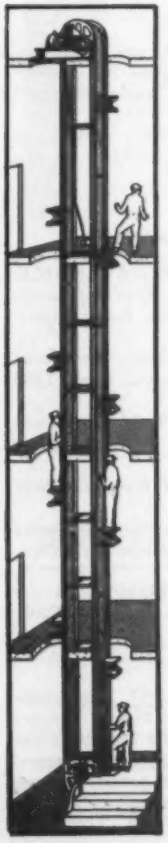

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New Literature . . .

Forest Diseases, Forest Insects, Forest Fire, Forest Utilization, Watershed Management and Range Management. There are also 14 pages that list the publications published by the members of the staff during 1957. Copies of this report are available by writing to Joseph F. Pechanec, Director, Southeastern Forest Experiment Station, Asheville, N. C.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Steelstrapper

Acme Steel Co. offers a new booklet on the A4 pneumatic steel strapper. The booklet shows typical applications, pictorial operating instructions and specifications on the new tool that provides power for every operation after the strap is inserted.

Circle No. 37 on Readers' Service Card

Sodium chlorate—properties and safe handling practices

Pennsalt Chemicals Corp. has published a technical bulletin giving the facts on sodium chlorate. The properties of the chemical are given in great detail along with safe handling practices that must be used. Because of the increasing use of sodium chlorate for production of chlorine dioxide in pulp bleaching, greater knowledge on the subject of handling this material is necessary.

Circle No. 38 on Readers' Service Card

A guide to better closures

Acme Steel Co. gives a report on various methods of closure, gluing, taping, stapling and wire stitching in a new 20-page booklet that is now available.

Circle No. 39 on Readers' Service Card

Catalog of equipment for pulp, paper and board mills

Bauer Bros. Co. has published a bulletin giving application data on the company's continuous and rapid cycle digesters, Centri-cleaners, double and single revolving disc refiners, pump-through refiners and Pressafiners.

Circle No. 40 on Readers' Service Card

Peroxide bleaching of mechanical pulps

E. I. duPont de Nemours & Co. Inc. is offering a copy of a new booklet that contains the latest information on bleaching groundwood with peroxide. The company has engaged in continual research in this field and has developed economical methods for producing bleached groundwoods in the 73-80 G.E. brightness range. This booklet contains technical data and suggested equipment layouts for bleaching both groundwood and chip mechanical pulp.

Circle No. 41 on Readers' Service Card

Standard throats and capacities

B-I-F Industries Inc., in a new technical bulletin, describes methods for selecting standard throats and capacities for velocity-increasing differential producers. Illustrative examples of formula applications are worked out to determine such economic factors as the pumping cost per year for differential producers under typical conditions. The bulletin also contains dimensional tables, capacity tables and performance charts.

Circle No. 42 on Readers' Service Card

Lift table

Southworth Machine Co. is offering a data sheet describing the portable model lift table. One of the many uses for this table is to facilitate unloading of sheets from machines. The table size is 24 × 51½ in.

Circle No. 43 on Readers' Service Card

Stainless steel pump

Heinicke Instrument Co. offers a bulletin describing the Cyclone pump. The company states that this pump easily outperforms any now existing centrifugal pumps. Made of polished stainless steel, it offers the highest efficiency, durability and corrosion resistance.

Circle No. 44 on Readers' Service Card

Instrumentation of water and waste treatment in pulp and paper mills

Fischer & Porter Co. is offering a reprint of an article on instrumentation of water and waste treatment in pulp and paper mills. The article was written by Arthur L. Landesman, manager, Pulp & Paper Dept., Fischer & Porter Co.

Circle No. 45 on Readers' Service Card

Vari-speed motor pulley

Reeves Pulley Div. of Reliance Electric & Engineering Co. has announced a completely redesigned variable-speed motor pulley line in a 19-page bulletin just published. Called the 90 Series Vari-Speed motor pulley, the units are designed for applications of from ½- through 15-hp, with up to 4-1 ratios of speed variation.

Circle No. 46 on Readers' Service Card

"The Good Old Days" of papermaking

Huyck Felt Co. has published a poem titled, "The Saga of the Submissive Superintendent." The poem is a nostalgic tale of the Good Old Days of papermaking, when paper was made with the hearts and muscles of men instead of with the instruments and highly refined fibers of today.

Circle No. 47 on Readers' Service Card

System for drying and baling pulp

Bauer Bros. Co. has published a bulletin describing the company's system for drying and baling pulp. The bulletin includes a diagram showing a typical installation of this system, along with other photographs and descriptions of equipment used in the system.

Circle No. 48 on Readers' Service Card

Impulse steam traps

Yarnall-Waring Co. presents a new bulletin giving detailed information on the company's complete line of impulse steam traps. Typical installations for all series are shown with useful dimension, capacity, weight and price lists.

Circle No. 49 on Readers' Service Card

Wrought iron conduit

National Electric Products Corp. is issuing an eight-page illustrated booklet discussing wrought iron's unique composition and describing the added corrosion protection provided by the company's method of processing.

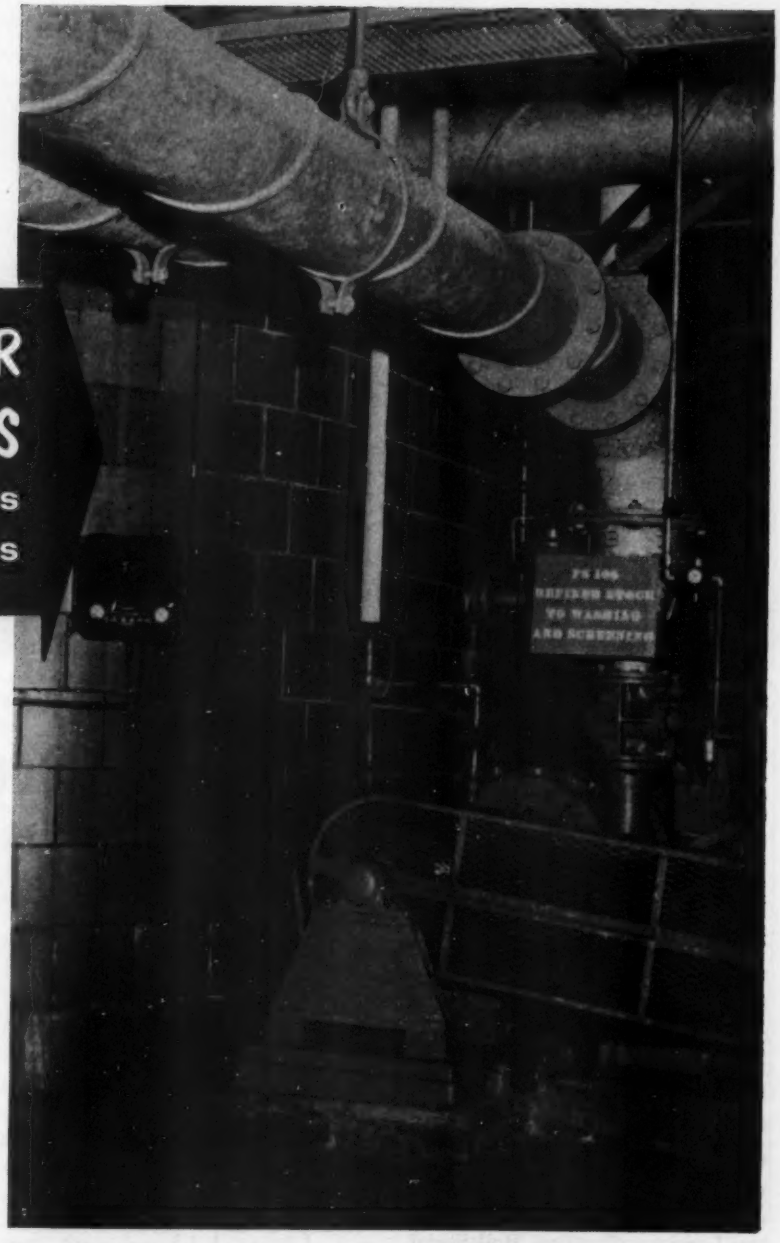
Circle No. 50 on Readers' Service Card

Agent for water-proofing paper

Nopco Chemical Co. has released a new data report on the Nopco size I—a water-repellent agent for paper specialties. Featured in the report as an internal size, the product is a dry compound that improves the water resistance of asbestos sheet, photographic printing papers and carbonate-filled papers.

Circle No. 51 on Readers' Service Card

Meet Your Exact Specifications...



With NAYLOR FABRICATIONS in Steel, Alloys and Stainless

You can depend on NAYLOR fabrication service to meet your most exacting paper mill piping requirements economically. This goes whether your specifications call for carbon steel, alloys or stainless steel.

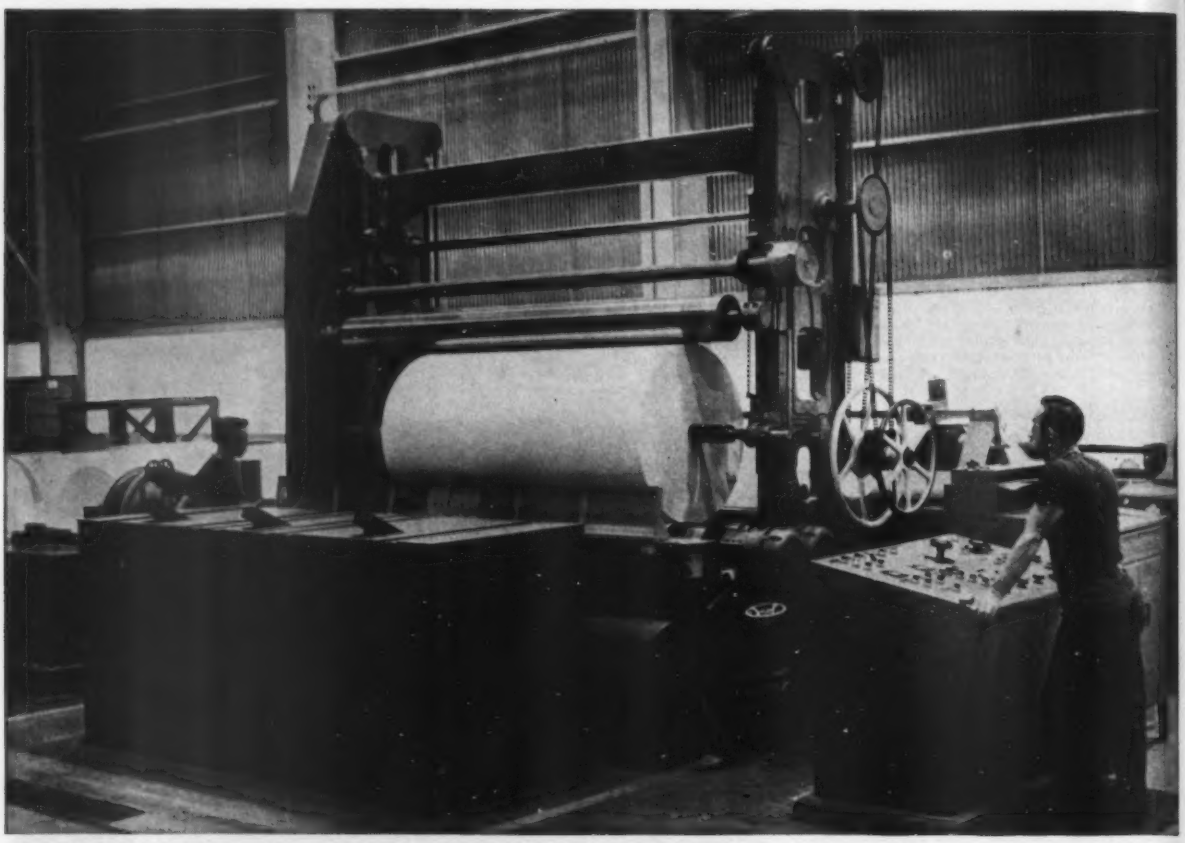
NAYLOR pipe comes in sizes from 4" to 30" in diameter, and thicknesses from 14 to 8 gauge. Standard fittings are available from stock. Special fabrications furnished from 3" to 44" in diameter and wall thickness up to 3/8".

To get the complete story, write for Bulletins No. 507 and No. 525, or send specifications for quotation.

NAYLOR PIPE Company

1233 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.



One of the two 104-in. Langston Slitters and Winders in the Glatfelter mill completing rewind. Roll drop table in foreground is up, ready to receive roll when ejected by the winder, and chocks are in raised position to stop the roll. Note console incorporating all major indicators and controls.

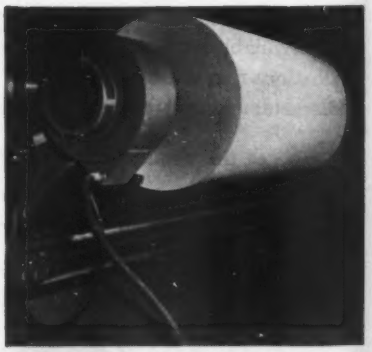
Langston Slitters and Winders turn out tight, even rolls at Glatfelter Mill

Two 104-in. Langston Slitters and Winders have been working in the new mill of P. H. Glatfelter Co., Spring Grove, Pa., for more than a year. They have proved themselves in round the clock production on grades from fine papers to book.

One of the most important features, according to the company, is the constant tension unwind control on the Langston Shaftless Roll Stand, which keeps the tension constant throughout the winding operation. Perfect rolls can be turned out from 9 to 100-lb. stock in roll widths from 7½ to 104 in.

The equipment can be quickly loaded and lined up on the back stand and is designed for easy threadup and gang slitter setting. Hydraulic roll ejectors move the finished rolls quickly from the winding position to the roll drop. Other features include shearcut slitters to eliminate dust; many interlocked controls for extra safety; automatic edge guide control to allow precision trim rewinding of narrow and salvage rolls.

Find out how Langston Slitters and Rewinders can benefit you. Write SAMUEL M. LANGSTON Co., 6th & Jefferson Sts., Camden 4, N.J.



Langston Shaftless Unwind Stand eliminates back-breaking, time-consuming task of hoisting heavy shafts into place. Hydraulically operated arms reach out, pick up the roll, and raise it into running position — a 1-man, pushbutton operation.

LANGSTON leadership...by design

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CONFIDENTIAL EMPLOYMENT SERVICE
For employers seeking new personnel and mill executives seeking new positions. We invite your inquiry.
CHARLES P. RAYMOND SERVICE, Inc.
294 Washington Street LIberty 2-6547 Boston 8, Mass.

NEW! PATENTED DEFIBERING EQUIPMENT for CONICAL REFINERS
U.S. Patent No. 2,838,981 covers very high turbulence defibering equipment. Groups of four or more standard refiner shell bars can be notched 20% to 50% of their length and used in four sections in refiner shells to produce accelerated defibering. Write David A. Dent, 750 Brompton Ave., Chicago 13, Illinois.

WANTED: One 5000KVA, 57Kv Delta 2300 Delta, 3 phase 60 cycle, oil filled air cooled transformer, with 2-2½ tap above and below. 7.27% Z. provision for future fans desirable. Reply to box 665, The Paper Industry.

Excellent opportunity for technical man with paper mill experience to call on mills as sales service representative for established chemical company. Salary based on knowledge and experience. Reply giving education, experience and background to Box 668, The Paper Industry.

WANTED — MECHANICAL ENGINEER
Must have experience in machine design and be able to handle drafting and layout of complete paper machines and auxiliary equipment for paper mills. Would consider practical engineer with wide experience and initiative. We offer good salary and opportunity to become executive of fast growing paper machinery manufacturing business. Must be capable and willing to work for opportunity to advance to a permanent executive position.
OSBORNE PAPER MILL EQUIPMENT CORP.
Fulton, New York **Tel. Lyric 2-4254**

You Can Be Sure!

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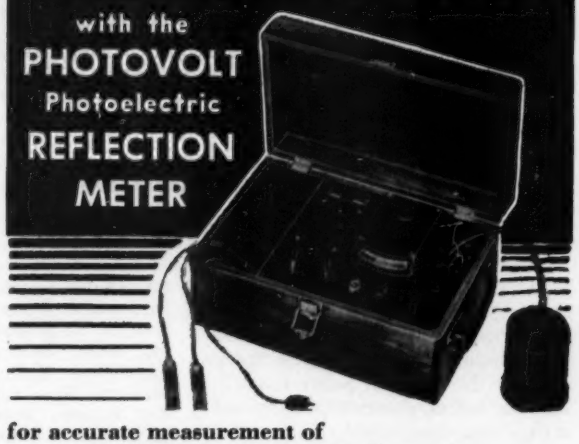

for accurate measurement of
Brightness and Opacity
of pulp and paper in terms of TAPPI specifications.
Also for ***Gloss and Color***
tests on paper, card board, and other paper products.
Portable, reliable, rugged, simple to operate
Also: Colorimeters, pH Meters

PHOTOVOLT CORP.
95 MADISON AVENUE NEW YORK 16, N. Y.

RES-LIN *wire saver*
SUCTION BOX COVER

offers these features:

1. Even distribution of fabric assures EVEN WEARING.
2. Ends of threads contact wire, assuring uniform surface to wire.
3. Increased wire life.
4. Many years of trouble-free service.
5. Resurfacing reduced to a minimum.
6. Expansion and contraction is reduced to a minimum.
7. Reslin can supply a greater open area without sacrificing strength.
8. Requires no wet storage or care when machine is down.
9. Easily installed.
10. No other can offer as even-wearing and wax-like surface as Reslin.

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NEW ENGLAND & NORTH ATLANTIC REPRESENTATIVE
George Clayton
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Norristown, Penn.
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Horace Hill
Rt. 7 — Box 926
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Write for Further Information and Sample of Material

APPLETON WOOD PRODUCTS CO.
APPLETON, WIS.

WILLIAMS-GRAY
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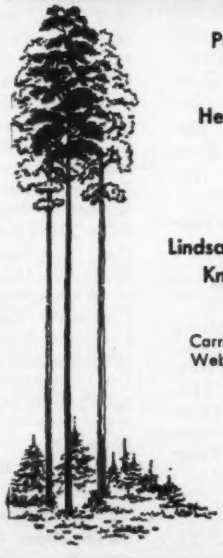
221 North LaSalle Street, Chicago 1, Illinois



Paul Foster • Peter Talbot
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Lindsay & Niagara Wires
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Mount Vernon Dryer Felts

Carrier Rope, Splicing Tissues, Deckle Webbing, Apron Cloth, Wire Brushes

SAFETY NEWS

7-Per Cent Decline Shown in NSC Contest's First Quarter

FOR THE THREE months ending March 31 some 290 contestants reported perfect scores in the 1958 Paper Industry Safety Contest sponsored by the National Safety Council. The number of contestants registered in the competition is 643.

Last year's first period record was 224 perfect scores registered in a "field" of 589.

The January-March frequency rate for all divisions (except pulpwood logging) was 6.44, a 7-per cent decrease from the same period of 1957. In the Pulp & Paper Div. the three-month rate was 6.08, a decrease of 10 per cent from a year ago. In Paper Converting a rate of 7.38 meant a 3-per cent decrease from the first quarter of 1957. Pulpwood Logging reported a rate of 35.21—down considerably from the 56.75 at the same time in 1957.

Contestants working the most man-hours in the January-to-March period without lost-time accidents were: Sutherland Paper Co., Kalamazoo, Mich.; Champion Paper & Fibre Co., Pasadena, Texas, and Scott Paper Co., Chester, Pa.

From the eligible mills in Division I the board of judges will choose the mill with the most outstanding record. This plant will be awarded the grand prize—the Edward Benton Fritz Memorial Trophy—during the National Safety Congress in October. The trophy is presented each year by Fritz Publications Inc., publisher of THE PAPER INDUSTRY.

Perfect scores recorded for the January-to-March period were as follows:

Division I—Pulp and Paper Mills

Group A

Sutherland Paper Co., Kalamazoo, Mich.; Champion Paper & Fibre Co., Pasadena, Texas; Scott Paper Co., Chester, Pa.; New Brunswick International Paper Co., Dalhousie, N. B.; Nekoosa-Edwards Paper Co., Port Edwards, Wis.; International Paper Co., Ticonderoga, N. Y.; Crossett Paper Mills, Crossett, Ark.

Group B

West Virginia Pulp & Paper Co.; Tyrone, Pa.; Container Corp. of America, Philadelphia; International Paper Co., Chisholm, Maine; Mersey Paper Co. Ltd., Liverpool, N. S.; Munising Paper Co., Munising, Mich.; Fraser Companies Ltd., Edmundston, N. B.; Marinette Paper Co., Marinette, Wis.; Crown Zellerbach Corp., Port Angeles, Wash.; Crown Zellerbach Corp., Port Townsend, Wash.; Brunswick Pulp & Paper Co., Brunswick, Ga.

Mead Corp., (Escanaba Paper Div.), Escanaba, Mich.; Owens-Illinois Glass Co. (Mill Div.), Valdosta, Ga.; Owens-Illinois Glass Co. (Mill Div.), Jacksonville, Fla.; Chesapeake Corp. of Virginia, West Point, Va.; St. Regis Paper Co., Tacoma, Wash.; Riegel Paper Corp. (Carolina Div.), Acme, N. C.; Morris Paper Mills, Morris, Ill.; Fibreboard Paper Products Corp. (Vernon Div.), Los Angeles; Fibreboard Paper Products Corp. (Antioch Div.), Antioch, Cal.

Group C

West Virginia Pulp & Paper Co., Williamsburg, Pa.; Container Corp. of America, Fernandina, Fla.; Rome Kraft Co., Rome, Ga.; Puget Sound Pulp & Timber Co., Bellingham, Wash.; Bergstrom Paper Co., Neenah, Wis.; Schmidt & Ault Paper Co., York, Pa.; Crown Zellerbach Canada Ltd., Ocean Falls, B. C.; Kimberly-Clark Corp. (Neenah Paper Co. Div.), Neenah, Wis.; Crown Zellerbach Corp., Carthage, N. Y.; Johns-Manville Products Corp., Manville, N. J.; American Can Co. (Marathon Div.), Menasha, Wis.; Kansas City Star Co. (Flambeau Paper Div.), Park Falls, Wis.; Falls Paper & Power Co., Oconto Falls, Wis.

Gaspesia Sulphite Co. Ltd., Chandler, Que.; Restigouche Co. Ltd., Cambellton, N. B.; Container Corp. of America, Wabash, Ind.; Fraser Companies Ltd., Newcastle, N. B.; Crystal Tissue Co., Middletown, Ohio; Strathmore Paper Co., West Springfield, Mass.; Price Bros. & Co. Ltd., Jonquiere, Que.; Canadian Johns-Manville Co. Ltd., North Bay, Ont.; Pacific Coast Paper Mills of Washington Inc., Bellingham, Wash.; Continental Can Co. Inc., Elkhart, Ind.; Congoleum-Nairn Inc., Cedarhurst, Md.; Weyerhaeuser Timber Co. (Grays Harbor Div.), Cosmopolis, Wash.; Fibreboard Paper Products Corp., Port Angeles, Wash.

Group D

Bird & Son Inc., Shreveport, La.; Owens-Illinois Glass Co. (Mill Div.), Big Island, Va.; Mead Corp., Sylva, N. C.; Georgia-Pacific Paper Co., Toledo, Ore.; United States Gypsum Co. Oakmont, Pa.; Container Corp. of America, Carthage, Ind.; United States Gypsum Co., Clark Township, N. J.; American Can Co. (Marathon Div.), Ashland, Wis.; Central Fibre Products Co., Tama, Iowa; Mead Corp. (Wheelwright Div.), North Leominster, Mass.; Fort Orange Paper Co. (Paper Mill), Castleton-on-Hudson, N. Y.; New Haven Board & Carton Co. (Bartgis Div.), Ilchester, Md.; Weston Paper & Mfg. Co., Terre Haute, Ind.; Philip Carey Co. Ltd., Lennoxville, Que.

Arvey Corp. (Ward Paper Co. Div.), Merrill, Wis.; Strathmore Paper Co., Turners Falls, Mass.; Coos Bay Pulp Corp., Anacortes, Wash.; Container Corp. of America, Chattanooga, Tenn.; Certain-Teed Products Corp., Savannah, Ga.; Certain-Teed Products Corp., East St. Louis, Ill.; Celotex Corp., Los Angeles, Cal.; New York & Pennsylvania Co., Willsboro, N. Y.; Coos Bay Pulp Corp., Empire, Ore.; Certain-Teed Products Corp., York, Pa.; Certain-Teed Products Corp., Richmond, Cal.; Latex Fiber Industries Inc., Beaver Falls, N. Y.; Bestwall Gypsum Co., Pryor, Okla.; Fibreboard Paper Products Corp., Sumner, Wash.

Group E

Crown Zellerbach Canada Ltd., Campbell River, B. C.; Scott Paper Co., Madison, Maine; Container Corp. of America, Noblesville, Ind.; Canadian Johns-Manville Co. Ltd., Asbestos, Que.; Spaulding Fibre Co. Inc., North Rochester, N. H.; National Gypsum Co., Kalamazoo, Mich.; Logan-Long Co., Franklin, Ohio; Flintkote Co., Lockport, N. Y.; National Gypsum Co., Garwood, N. J.; St. Regis Container Corp. (Muskingum Mill Div.), Coshocton, Ohio; Mead Corp., Nashville, Tenn. (plant closed); St. Regis Paper Co., Herrings, N. Y.; Strathmore Paper Co. (Mill No. 1), West Springfield, Mass.; Pollock Paper Corp., Columbus, Ohio; Robertson Paper Box Co. Inc., Montville, Conn.; Central Fibre Products Co., Denver, Colo.; Quaker Oats Co., Pekin, Ill.; Flintkote Co., Little Ferry, N. J.; Flintkote Co., Mt. Carmel, Ill.; American Writing Paper Corp. (Gill Div.), Holyoke, Mass.

Riegel Paper Corp., Riegelsville, N. J.; United States Gypsum Co., Gypsum, Ohio; Container Corp. of America, Wilmington, Del.; Banner Fibreboard Co., Wellsburg, W. Va.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Dresden, Ohio; Celotex Corp., Avery, Ohio; Charmin Paper Products Co., Little Rapids, Wis.; National Gypsum Co., Newburgh, N. Y.; Johns-Manville Corp., Tilton, N. H.; International Paper Co., Riley, Maine; Kimberly-Clark Corp., New Milford, Conn.; Rayonier Inc., Shelton, Wash.; Rogers Corp., Manchester, Conn.; Spaulding Fibre Co. Inc., Milton, N. H.; National Vulcanized Fibre Co. (Marshall Bros. Mill), Yorklyn, Del.; Container Corp. of America (Western Container Div.), Tacoma, Wash.

Division II—Paper Converting

Paper Bags

Olin Mathieson Chemical Corp. (Bag Div.), West Monroe, La.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Bogalusa, La.; Crown Zellerbach Corp., Los Angeles, Cal.; St. Regis Paper Co., Franklin, Va.; St. Regis Paper Co.,

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.70— .75
No. 2 roofing (Chicago)	.50— .55
Twos and blues, repacked	1.50— 1.75
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	4.75— 5.00
Gunny No. 1, foreign	4.50— 5.00
No. 1 manilla rope, domestic	6.00— 7.00
No. 1 manila rope, foreign	5.00— 6.00
New burlap cuts (soft)	6.00— 6.50
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	90.00—100.00
No. 1 hard white shavings	75.00— 80.00
No. 1 soft white shavings	45.00— 50.00
Soft white shavings, uncoated	45.00— 55.00
Fly leaf shavings No. 1	15.00— 20.00
Fly leaf, woody, No. 1	17.00— 22.00
Mixed colored shavings	15.00— 17.00
No. 1 books and magazines	13.00— 14.00
Ledger stock, white, No. 1	35.00— 37.50
Ledger stock colored, No. 1 (Midwest ship)	25.00—
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	60.00— 65.00
Colored tab cards	45.00— 55.00
New northern kraft envelope cuttings	55.00— 60.00
Triple sorted kraft, 100%	25.00— 30.00
No. 1 old kraft	25.00—
White news cuts, No. 1	40.00— 45.00
No. 1 overissue news	14.00— 16.00
Folded news, special	12.00— 13.00
Folded news, ordinary	10.00— 11.00
Old corrugated boxes	19.00— 20.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	6.00— 7.00
No. 1 mixed paper	3.00— 4.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	60.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	115.00—
L. c. l., ton	125.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00— 12.00
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.15—
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb.	.29⅜—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb.	.13¾—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	9.05—
N	9.20—
WG	9.70—
WW	9.80—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	7.80—
N	7.90—
WG	8.25—
WW	8.50—
Saltcake, domestic, bulk works, 100% Na_2SO_4, basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.53—
Pearl, 100-lb. bags, cwt.	7.38—
Powdered, 100-lb. paper bags, cwt.	7.50—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—
High-tinting, drums, c. l., lb.	.14⅜—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15⅛—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—162.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Uubleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10

Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	8.50
60-lb.	8.75
50-lb.	9.00
40-lb.	9.25
35-lb.	9.75
30-lb.	10.50
25-lb.	11.25
20-lb.	12.25
No. 1 Kraft Butcher — Pink	
	per cwt
40-lb. only	10.00
(Sheets — Plus 50c cwt)	

FLIPPING the LINT OFF "FLIP-TOPS"

Jenkins' METLKOR Web Cleaning Brush of DuPont Tynex Nylon

The gravure production plant of the Downingtown Paper Box Company, Downingtown, Pennsylvania is an engineering triumph. Here, Marlboro "flip-tops" are produced on Champlain presses at speeds up to 2400 cartons per minute.

HERE'S WHAT THE DOWNINGTOWN PAPER BOX COMPANY SAYS: Mr. George J. Wolfer, Gravure Supt. says: "Jenkins' METLKOR brushes are contributing to the overall economy and quality that is so important to our production. When we reorder brushes, they will be Jenkins' METLKORS."

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Toledo, Ohio; Thilmany Pulp & Paper Co., Kaukauna, Wis.; St. Regis Paper Co., Vancouver, B. C.; Union Bag-Camp Paper Corp., St. Louis; St. Regis Paper Co., Nazareth, Pa.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Bogalusa, La.; Pillsbury Mills Inc., Wellsburg, W. Va.; St. Regis Paper Co., San Leandro, Cal.; St. Regis Paper Co., Dryden, Ont.; St. Regis Paper Co., Kansas City, Mo.; St. Regis Paper Co., Playa Ponce, P. R.

Boxes and Cartons

Group A

Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Plymouth, N. C.; Sealright Co. Inc., Kansas City, Kans.; Michigan Carton Co., Battle Creek, Mich.; Container Corp. of America, Philadelphia (Manayunk), Pa.; Stone Container Corp., Chicago; General Foods Corp. (Carton & Container Div.), Battle Creek, Mich.; Great Lakes Box Co., Cleveland; Container Corp. of America, Cincinnati; Container Corp. of America, Valley Forge, Pa.; New Haven Board & Carton Co., Ilchester, Md.; Container Corp. of America, Los Angeles; Robertson Paper Box Co. Inc., Montville, Conn.

Green Bay Box Co. (Corrugated Div.), Green Bay, Wis.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Atlanta, Ga.; Fibreboard Paper Products Corp. (Vernon Carton Plant), Los Angeles; Fibreboard Paper Products Corp. (Carton Plant), Stockton, Cal.; American Can Co. (Marathon Div.), Modesto, Cal.; International Paper Co., Whippany, N. J.; Fibreboard Paper Products Corp., South Gate, Cal.; Fibreboard Paper Products Corp., Portland, Ore.; Fibreboard Paper Products Corp. (Container Plant), Stockton, Cal.; Fibreboard Paper Products Corp. (Container Plant), Sumner, Wash.; Fibreboard Paper Products Corp. (Container Plant), Antioch, Cal.; St. Regis Paper Co. (Hunt-Crawford Div.), Coshocton, Ohio.

Group B

Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Milwaukee; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Dallas, Texas; Container Corp. of America (Container Div.), Chattanooga, Tenn.; Container Corp. of America (Folding Carton Plant), Philadelphia (Manayunk), Pa.; Canton Corrugated Box Co., Canton, Ohio; Container Corp. of America (Boyle Ave.), Los Angeles; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Greenville, S. C.; Cleveland Corrugated Box Co., Cleveland; Container Corp. of America, Oakland, Cal.; St. Regis Container Corp. (Superior Paper Products Co. Div.), Mt. Wolf, Pa.; Container Corp. of America (Carton Div.), Chattanooga, Tenn., Container Corp. of America, Santa Clara, Cal.; Union Bag-Camp Paper Corp., Chicago; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), St. Louis, Mo.; Dairypak Inc., Clinton, Iowa; Fort Wayne Corrugated Paper Co., McKeesport, Pa.; Hoerner Boxes Inc., Sand Springs, Okla.; Bradley & Gilbert Co., Louisville, Ky.; Container Corp. of America, Baltimore; Mengel Co., Louisville, Ky.; Container Corp. of America, Greensboro, N. C.; Container Corp. of America (Carton Div.), Cleveland.

Container Corp. of America, Fernandina Beach, Fla.; Container Corp. of America (Container Div.), Seattle; Container Corp. of America (Lake Shore Plant), Chicago; Hankins Container Co., Chicago; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.) (Litho Div.), Rochester, N. Y.; Container Corp. of America (Carton Div.), Seattle; International Paper Co. (Single-Service Div.), Philadelphia; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), San Antonio, Texas; Dairypak Inc., Athens, Ga.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Colton, Cal.; Container Corp. of America, Muskogee, Okla.; Container Corp. of America, Portland, Ore.; Mengel Co., Winston-Salem, N. C.; Mengel Co., Fulton, N. Y.; International Paper Co. (Single-Service Div.), East Point, Ga.; Hoerner Boxes Inc., Little Rock, Ark.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.) (Corrugated Div.), Rochester, N. Y.; Container Corp. of America (Container Div.), Cleveland; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), St. Louis; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), New Orleans; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Parkersburg, W. Va.; Dairypak Inc., Fort Worth, Texas.

Marathon Corp. of Washington, Sunnyside, Wash.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Alameda, Cal.; American Can Co. (Marathon Div.), Newnan, Ga.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Belleville, Ill.; Fibreboard Paper Products Corp., San Francisco; International Paper Co. (Single-Service Div.), Waco, Texas; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Austin, Minn.; International Paper Co. (Single-Service Div.), Minneapolis; International Paper Co. (Single-Service Div.), Youngstown, Ohio; St. Regis Paper Co. (Niagara

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Roofing Paper

Ruberoid Co., Mobile, Ala.; Ruberoid Co., South Bound Brook, N. J.; Flintkote Co., Chicago Heights, Ill.; Ruberoid Co., Erie, Pa.; Bird & Son Inc., Charleston, S. C.; Allied Chemical Corp. (Barrett Div.), Elizabeth, N. J.; Certain-Teed Products Corp., Chicago Heights, Ill.; Brantford Roofing Co. Ltd., Brantford, Ont.; Johns-Manville Corp., Marrero, La.; Ruberoid Co., Millis, Mass.; Johns-Manville Corp., Savannah, Ga.; Ruberoid Co., Denver, Colo.

Ruberoid Co., Baltimore, Md.; Ruberoid Co., Erie, Pa.; Celotex Corp., Cleveland; Certain-Teed Products Corp., Dallas; Flintkote Co. (Pioneer Div.), Portland, Ore.; Brantford Rofing Co. Ltd., Lachine Plant; Ruberoid Co., Minneapolis; Certain-Teed Products Corp., Kansas City, Mo.; Brantford Roofing Co. Ltd., Thorold, Ont.; Brantford Roofing Co. Ltd., St. John, N. B.; Fibreboard Paper Products Corp., Portland, Ore.; Fibreboard Paper Products Corp., Wilmington, Cal.; Certain-Teed Products Corp., Tacoma, Wash.

Insulation and Building Board

Wood Conversion Co., Cloquet, Minn.; Armstrong Cork Co., Macon, Ga.; National Gypsum Co., Mobile, Ala.; Johns-Manville Corp., Jarrat, Va.; Kaiser Gypsum Co., St. Helens, Ore.; Johns-Manville Corp., Natchez, Miss.; Flintkote Co., Hilo, H. I.; Oregon Lumber Co., Dee, Ore.; Flintkote Co. (Insulrock Div.), Linden, N. J.

Specialties

Crown Zellerbach Corp. (Western Waxide Paper Div.), San Leandro, Cal.; Crown Zellerbach Corp. (Western Waxide Paper Div.), Portland, Ore.; Container Corp. of America (Sefton Fibre Can Div.), St. Louis, Mo.; Lily-Tulip Cup Corp., Augusta, Ga.; Crown Zellerbach Canada Ltd., Vancouver, B. C.; Old Colony Envelope Co., Westfield, Mass.; St. Regis Paper Co. (Gummed Products Co. Div.), Troy, Ohio; Crown Zellerbach Corp. (Western Waxide Paper Div.), St. Louis, Mo.; Line Material Co., Sherman, Texas; Scott Paper Co., Sandusky, Ohio; Kimberly-Clark Corp., Appleton, Wis.; Container Corp. of America, Portland, Ore.

Bay West Paper Co., Green Bay, Wis.; Container Corp. of America (Sefton Fibre Can Div.), Jefferson, Ind.; Crown Zellerbach Corp. (Western Waxide Paper Div.), Kansas City, Mo.; Kimberly-Clark Products Ltd., Winnipeg, Man.; Mid-West Wax Paper Co., Fort Madison, Iowa; Container Corp. of America (Sefton Fibre Can Div.), Oakland, Cal.; Container Corp. of America, New Orleans, La.; Lily-Tulip Cup Corp., Chicago; Lily-Tulip Cup Corp., Brooklyn; Lily-Tulip Cup Corp., Galva, Ill.; Lily-Tulip Cup Corp., Monticello, Ind.

Division III—Pulpwood Logging

St. Regis Paper Co., Bucksport, Maine; Continental Can Co. (Southern Advance Bag Operations), Hodge, La.

Air Safety at Champion

Safety awards representing 2,000,000 miles of air travel without an accident have been presented to Champion Paper & Fibre Co. by the Ohio State Aviation Board.

In a ceremony at Lunken Airport at Cincinnati the firm was recognized for the greatest number of safe flying miles of all corporate aircraft in the Cincinnati area.

Champion's three Cincinnati-based planes include two passenger Lockheed Venturas and a four-passenger Cessna 310. The firm employs five pilots in Cincinnati.

Paperboard Safety Improves

The accident frequency rate in the nation's paperboard mills declined 5 per cent in 1957 as compared with 1956. This was recently announced by the National Paperboard Association.

PAPER INDUSTRY

Whither?

. . . in production, processes, new products, market

In search of fungi that help growth of trees

United States Department of Agriculture scientists are looking for the most effective fungi and the best soil innoculation methods that will aid the development of mycorrhizae, which are formations of fungi and roots. In such a formation, the fungi with their thread-like filaments penetrate the roots of trees and help them absorb the soil nutrients.

It is believed that proper innoculation of the soil with the most effective mycorrhizal fungi could have a marked effect on the rate of forest growth.

A new polyester laminating film

Videne, a new film developed by Goodyear Tire & Rubber Co. Inc., can be made to adhere to a variety of papers by the application of heat and pressure and without the aid of adhesives. If needed, the paper can be printed and the film then applied as a protective surface. On the other hand, the film itself can be printed and embossed to provide a decorative and protective coating.

For packaging, various papers and paper combinations, foil, etc., can be combined with Videne A to produce packaging materials for liquids and food products.

Fiberboard provides protection against radioactive fall-out

The United States Forest Products Laboratory has developed a fiberboard that provides protection against most of the deadly effects of radioactive fall-out from nuclear fission.

The fiberboard, impregnated with special chemicals, allows free passage of oxygen — thus making it a useful material for the construction of emergency shelters for use during an atomic attack.

Pulping with ammonia base liquor

Among the advantages of ammonia base liquor, as previously reported, are reduced cooking times, improved yields, successful pulping of pines and hardwoods, lower sulfur consumption, etc.

According to Canadian Industries Ltd., the cost of conversion to ammonia base pulping in a sulfite mill ranges from about $22,000 for a 100-ton mill to about $52,000 for a 400-ton mill. For a 100-ton mill, the annual profit improvement would range from $19,000-$245,000 depending on the efficiency of mill operation.

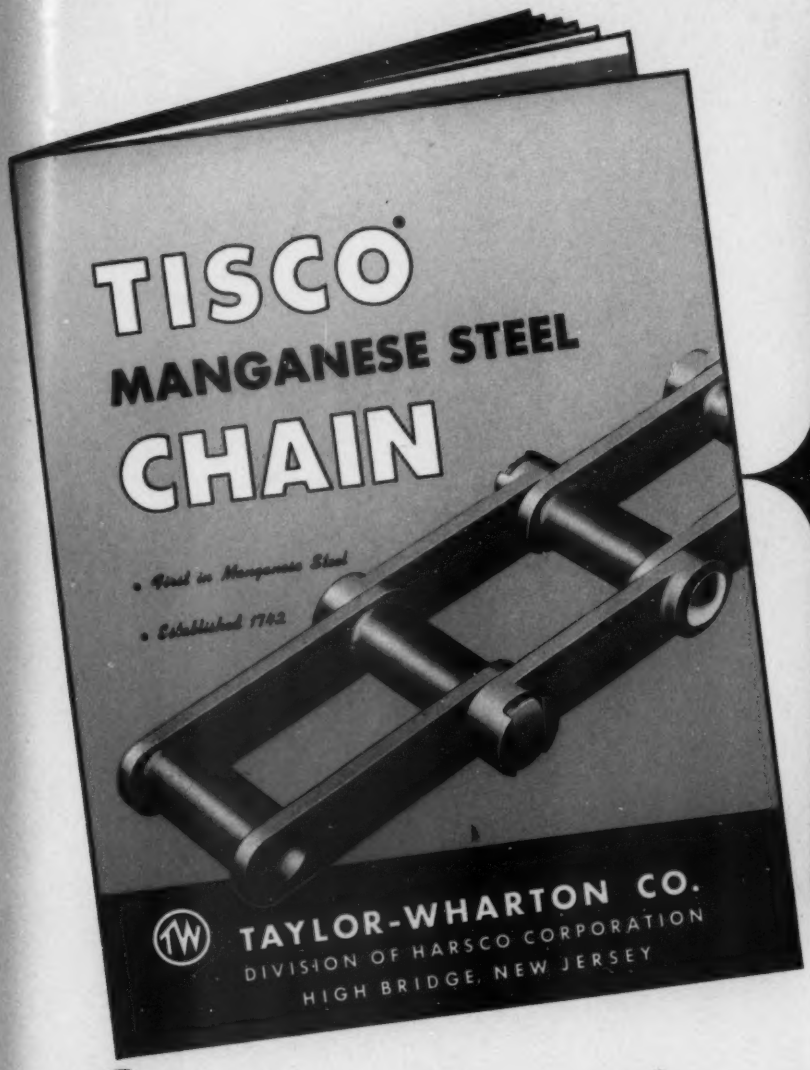
Use of fiber containers for packaging jordan fillings

The Shartle Div. of Black-Clawson Co. has adopted the use of five sizes of a special, double-construction corrugated container for packaging and shipping jordan fillings and plug bars.

The new package keeps the filling clean and dry, facilitates handling and storage, and permits repulping of the container after use.

New weatherproof packaging material

A plastic-coated kraft paper packaging developed by Georgia-Pacific has been shown to withstand by actual tests 500 days' exposure to outside weather conditions. At the end of the test the paper was shown to have retained its weatherproofness, flexibility, toughness, scuff resistance, etc.



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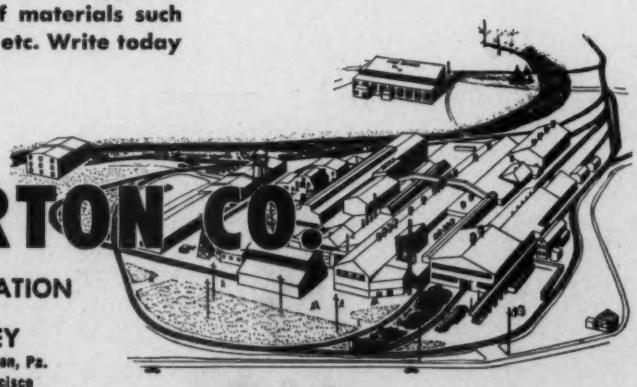

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